FIGHTING STEEL

WORLD WAR II SURFACE COMBAT
1939-1942

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■ INTRODUCTION

FIGHTING STEEL recreates spectacular, WWII naval gunnery battles from the period 1939-1942. You command warships from the British, German, Japanese, or United States navies in real-time, 3D action.

Single or Multiplayer Play: Play against up to three other players over the Internet, or play solo against the program's AI (Artificial Intelligence).

Modes of Play: In Standard mode, you control all of the divisions on one side (each division consists of one or more ships). In Division Commander mode, you control only one division, and the program's AI commands the others on your side.

Difficulty Levels: Select from four difficulty settings to make the game easier or more challenging. The levels range from Ensign (beginner) to Admiral (expert) level.

Unlimited Scenarios: The game includes 12 Historical Scenarios plus Campaign games of linked battles in both the Atlantic and Pacific theaters. You can design your own battles with a Scenario Editor that includes over 90 classes of warships (1,000 individual ships), or use the game's Battle Generator to create an unlimited number of computer-generated scenarios to provide hundreds of hours of non-repetitive game play.

Player Preferences: An extensive Preferences list allows you to make changes to realism effects, camera, audio, and other game settings.

If you have been waiting for a 3D, WWII naval surface game, FIGHTING STEEL is it.

Getting Started

If you want to get a quick start, refer to the "Tutorial" section of the manual, which begins on page 6. It provides a step-by-step battle plan to familiarize you with the screens and basic features of a FIGHTING STEEL scenario. If, however, you prefer to familiarize yourself with the game as a whole, turn to the "GameOverview" section on page 12.

What Comes with this Game?

Your game box should contain this user manual and a FIGHTING STEEL CD. This user manual explains how to play and contains important information on menus, scenarios, and unit classes and equipment. To get the game running on your computer, see the installation instructions following.

■ SYSTEM REQUIREMENTS

To play FIGHTING STEEL, be sure your system meets the following system requirements:

• Pentium 200 MHz IBM PC or compatible

• 64 MB of RAM

• Windows® 95 or 98 - NOTE: This is a Windows 95 game and cannot be played on Windows® NT systems. Multitasking is not recommended when playing FIGHTING STEEL.

• An **Uncompressed** hard drive with 175MB free for the "Recommended" install

• 4X CD-ROM drive or faster

• A 3D accelerated SVGA video adapter with 4 MB of memory and a Color SVGA Monitor

• A 100% Microsoft (or Logitech) compatible mouse

• Microsoft mouse driver version 9.00 or higher or Logitech mouse driver version 6.24 or higher

In addition to the basic system requirements, the game requires that DirectX 6.1 be installed to your hard drive. The option to install DirectX 6.1 appears during the game installation. For network play, you need a DirectPlay compatible network adapter. In order to play on the internet you will need a 28.8 modem and an account with an internet service provider.

Installing the Game

You must install FIGHTING STEEL game files to your hard drive and have the FIGHTING STEEL CD in your CD-ROM drive to play this game or use the Scenario Builder.

To install the game, insert the CD into the CD-ROM drive. When the pop-up window appears, click on the Install option. If you have disabled the Windows Autorun, or if it does not function, Explore the CD and double-click on the Setup icon. Follow all on-screen prompts to complete the installation.

Starting the Game

The FIGHTING STEEL Autorun program displays a menu with the options to install the game, the Scenario Builder, Install Direct X, Uninstall the game, or view the README.RTF file, every time the CD-ROM drive is closed with the CD in place. FIGHTING STEEL can also be started by opening the Start menu, selecting Programs and choosing the folder where FIGHTING STEEL was installed and double-clicking on the FIGHTING STEEL program item.

For complete and specific "how to play" information, please refer to the rest of the manual. Some changes were made too late to include in this manual. Please read the README.RTF file in your game directory for more information.

Uninstalling the Game

To uninstall the game, select that option from the Autorun menu, or choose Settings from the Windows 95 Start Button, and select Control Panel. In the Control Panel, select Add/Remove Programs, left-click on FIGHTING STEEL, and click on the Add/Remove button. The game and all of its components are then removed from your hard drive, except for your saved games or edited scenarios.

Saving Games

FIGHTING STEEL requires space on your hard drive for Saved Games and temporary files. Each saved game can take up to 1.5 MB of hard drive space. Note: If you exchange a saved game with someone, it is important to note which slot it occupied since it can only be played from that position in the save game list.

Sound and Video Cards

FIGHTING STEEL requires Windows 95, DirectX 6.1 compliant sound and video cards. If you experience problems with sound or video while playing FIGHTING STEEL please contact the manufacturer of your video or sound card for the latest DirectX 6.1 compliant drivers. If such drivers are not used, FIGHTING STEEL may not run properly on your system.

DirectX 6.1 Setup

This game requires DirectX 6.1. If you do not have DirectX 6.1, then it can be installed or reinstalled from the CD. Installing DirectX 6.1 is an option when installing the game. It can also be installed by exploring the game CD, and opening the DIRECTX folder. Double click on DXSETUP.EXE to start the DirectX 6.1 install.

Using either the Install DirectX 6.1 button from the Autorun or DXSETUP.EXE, you can install DirectX 6.1, reinstall DirectX 6.1, test your drivers certification, or reinstate your previous audio and video driver as described following.

DirectX Disclaimer

FIGHTING STEEL utilizes Microsoft's DirectX sound and video drivers. DirectX is a programming tool created by Microsoft, and the installation of DirectX may cause video problems and system anomalies with computers using video drivers that aren't DirectX compliant. DirectX is a Microsoft product, and as such, this publisher cannot be responsible for changes that might occur to your computer system due to its instal-

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lation. For DirectX related problems that cannot be fixed by updating to your video card's latest Windows driver set, you must contact either Microsoft or the manufacturer of your video card for further technical support or service.

Microsoft retains all intellectual property rights to DirectX. The user has been granted a limited license to use DirectX with Microsoft operating system products.

■ CONTACTING TECHNICAL SUPPORT

Ubi Technical Support

Technical support: 0870 800 6160 (local rate call)
Hints and tips hotline service: 0960 466 5200 (premium rate call)

On-line Support Options

Ubi Soft offers several on-line support options for their softwareproducts.
One of these is our website at: http://www.ubisoft.co.uk/support/
If you have a specific problem that is not addressed on our site, you can send your question to us via e-mail at: techsupport@ubisoft.co.uk

Please be as specific as you can be about the problem you are experiencing. Also include in the body of your e-mail: the name of the manufacturer of your computer system; the brand and speed of the processor; how much RAM you have, the version number of Windows you are using (if you aren't sure, right-click on the My Computer icon on your desktop and select 'Properties'), and the manufacturer name and model-number of your video card, modem, and sound card.

Other Support Options

You can also contact Ubi Soft Customer Support by phone and fax. When you call, please have all of the above mentioned information ready.

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In Nederland: Telefoonnummer: 0900 202 6766 (50 cpm) Tijden: maandag tot en met vrijdag van 09:30 tot 18:00 uur.
E-mail : techsupport@ubisoft.nl

In Belgie: Telefoonnummer: 02 73.25.57.7
E-mail: hotmail@ubisoft.be

Scandinavia: Ubi Soft Nordic Support
Ubi Soft Nordic offers different possibilities to obtain support. On our website:
http://www.ubisoft.dk If you have a question, which is not described on our website, please e-mail us at: support@ubisoft.dk
Other ways of reaching us: By telephone or fax, please call:
Telephone: (0045) 38 32 02 50
Fax: (0045) 38 33 34 49

SSI Online

If the game about which you are inquiring has been out for more than 90 days, you'll also want to visit out website to be sure you are running the latest version of the game before contacting SSI Technical Support. The SSI website is located at www.ssionline.com. From time to time, addition al scenarios and maps may also be post to this website.

Copy Protection

In order to play FIGHTING STEEL, the game CD must be in the CD-ROM drive.

■ QUICK START TUTORIAL

This tutorial section is designed to get you playing the game as quickly as possible. First, we'll walk you through Tutorial I, which is a day battle. When you've finished that, we'll walk you through Tutorial II, which is a night battle. To assist you, we have <u>underlined</u> all the actions that <u>you should do.</u> Ready? Let's go!

Tutorial I

1. When you start the game, an introductory sequence begins, and the Main Menu appears after that. <u>Highlight and click on Play a Scenario</u> from the Main Menu.

2. The Scenario Selection screen appears. <u>Click on the page-down scroll button.</u> You're looking for Tutorial I. <u>Click once on Tutorial I</u> to highlight it, then read the scenario description on the right-hand panel. <u>Double-click on Tutorial I</u> when you're ready to begin.

3. The Player Options screen appears. You're going to command the British force at the Lieutenant difficulty level in Standard mode. <u>Click on the Check button</u> to proceed.

4. The Scenario Launch screen appears. You have a division of two ships: CA (heavy cruiser) *Norfolk* and CL (light cruiser) *Sheffield*. <u>Click on either ship</u> to select the division. *Norfolk* is the flagship of your division. Your mission is to destroy the enemy. Would you like to change that steel-gray camo scheme for your ships? <u>Click on the right camo scroll button.</u> There are nine camo patterns to choose from, so keep clicking till you find the one you think is cool (dress for success, we say). <u>Click on the Check button</u> to proceed.

5. The 3D View screen appears and the game is in Pause mode. The camera is positioned above and behind your division. The *Norfolk* is visible in the middle distance at the head of the column. Let's close the bottom panel and go to a full-screen 3D view. <u>Move the cursor to the top of the screen.</u> The Function Bar drops down from the top. <u>Click on the F2 tab or press the</u> [F2] <u>key</u> to bring up the full-screen view.

6. The camera is currently in Semi-Free mode, so let's experiment with it.

    a) <u>Click on the Ship/Division View toggle button or press</u> [Z]. The camera moves in closer to *Norfolk* because you just switched from a camera view that focuses on the whole division to one that focuses on a single ship.

    b) <u>Click twice on the Previous button or press</u> [↑] <u>twice.</u> The camera revolves 45 degrees each time, so now you have a broadside view of *Norfolk*'s starboard

(right) side.

c) <u>Press</u> [P] <u>to unpause</u> the game. Use the Previous/Next buttons or Tab/Shift-Tab to change your view of your flagship steaming along in good condition. In about a minute, some binocular contact reports will appear and the Auto-Camera will suddenly jump to display a German ship that your observers have just sighted at over 15,000 yards range. When the Auto-Camera event is over, the camera returns to your previous view. <u>Press</u> [P] <u>to pause</u> the game at that time.

d) Pausing the game to give orders is cheating in our book, but you're new at the job so we'll look the other way. <u>Click on the Camera Selection button</u> on the right-hand control panel. A pop-up appears. <u>Click on the yellow, Look Thru arrow.</u> The camera view changes to look over your ship at the enemy ships, which are distant contacts on the horizon. They're hard to see right now because they're eight miles away.

7. Would you like to open fire or would you rather wait? – just kidding! Press ⌷F2⌷ to bring back the Division Pane/ at the bottom of the screen. This is the panel where you give orders to your division, or even to individual ships, and check on their status. Click on the Main Guns button. The Main Guns Summary Panel appears. *Norfolk* is armed with eight 8" main guns, while *Sheffield* carries a dozen 6" main guns. Click on the Orders button or press ⌷M⌷.

   a) The Division Main Guns Panel appears. There are two or three targets out there, and you've got two ships in your division. Click on the Battleline targeting mode button at the bottom left corner of the panel. This orders your ships to fire their main guns at separate targets. Highlight the Auto-Select Ammo button to let the program select your ammo type, or choose your own. Press ⌷P⌷ to unpause the game. Watch the main gun turrets on your ships swivel to starboard to face the enemy, after which they open fire.

   b) Let's throw some more metal at the enemy. Click on the Secondary Guns button or press ⌷S⌷. The Division Secondary Guns Panel appears. Click on the Range targeting mode button. This orders your ships' secondary guns to open fire against the closest enemy target.

8. Press ⌷P⌷ to pause the game as soon as you notice that the German CL *Konigsberg* is within 15,000 yards. She's the biggest enemy ship in view, and we'll launch torpedoes at her in a minute, but first let's find out more information about her. Hold the left mouse press down over *Konigsberg*'s Primary ID Tag (or ship graphic) on the horizon. Her Secondary ID Tag pops up until you release the mouse press. Secondary ID Tags provide quick information about a ship, including the number and type of guns, speed, heading, and structure and flotation damage. It's early in the battle, so *Konigsberg* may not be damaged, but this gives you an idea of what you're up against. Now let's launch some fish in her direction.

9. Click on the Torpedoes button. The Torpedoes Summary Panel appears, and the Division Summary button highlights (instead of the Orders button). Each of your cruisers carries two torpedo mounts, one on each side of the ship. You're going to launch your starboard torpedoes. You always launch torpedoes one ship at a time (not by division).
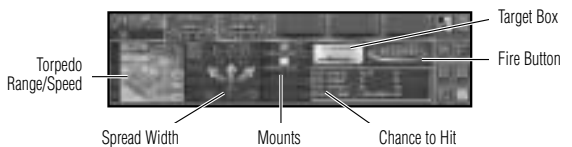
   a) Click on *Norfolk*'s Ship Box at the top of the panel to bring up the Single-Ship Torpedoes Panel.

   b) Click on the Target List Box of the Single-Ship Torpedoes Panel.

   c) Click on *Konigsberg* to select her as the target for *Norfolk*'s torpedoes.

   d) Click on the starboard torpedo mount icon. A Fire button appears. Your torpedoes should be set to run 15,000 yards at 35 knots with a Normal Spread width. Click on the Fire button to launch the torpedoes.

   e) You're now going to give orders to *Sheffield*. Click on *Sheffield*'s Ship Box or press ⌷2⌷. *Norfolk* is the first ship in the division, so pressing ⌷1⌷ shifts the single-ship panel to her. Pressing ⌷2⌷ shifts the single-ship panel to the second ship in the division, etc. Select *Konigsberg* as the target for *Sheffield*'s torpedoes, and click on the starboard torpedo mount icon to activate the Fire button.

   f) Click on Wide Spread just to be different – the torpedo spread will cover a wider arc, but the chance of hitting a ship within that wide arc is reduced. Click on Fire, and press ⌷P⌷ to unpause.

10. The torpedoes splash away on their paths. You no longer have starboard torpedoes because there are no reloads during battle. You may sit back and watch events for a while, but you should consider changing course and speed – if you fired torpedoes at the enemy, it's very possible they have done the same against you. The quickest way to change course is by Auto-Plot. Move the cursor to the Function Bar and click on F1 or press ⌷F1⌷. The 2D Map screen appears. Press ⌷P⌷ to pause the game.

   a) You can play the game from the 2D Map or the 3D View or switch between them as you desire. However, the Auto-Plot feature is only available on the 2D Map. Your division is currently headed north, with three German ships off to the east. Let's see where your torpedoes are. Click on the Map Display Info button of the Map Control Panel. A pop-up appears. Click on the Torpedo Cones button to display your torpedo cones. Enemy torpedo cones are never displayed, but they're probably out there, so we want to change course at frequent intervals to avoid their cones.

b) Click on the Auto-Plot button of the Map Control Panel. The Navigation Panel appears. Navigation orders are always given at the division level. Click anywhere on the 2D map to issue a turn order to your division. The projected path of your ships appears. If you don't like the path you chose, click somewhere else on the map. It is best to angle your ships so that all of their guns can train on the enemy. Turning directly toward the enemy blocks the fire from your aft guns, while turning directly away from the enemy blocks the fire from your forward guns.

Ordered Heading
Choose Bearing Buttons
Execute Turn or Cancel
Turn Information
Smokescreen
Strategic Map
Selected Division
Recognition Lights
Evasive Maneuvers
Emergency Turn
Port Turn Button (red)
Starboard Turn Button (green)
Column Turn Button
Current Heading
Line Turn Button
Current Speed
Ordered Speed
Maximum Speed
Change Speed
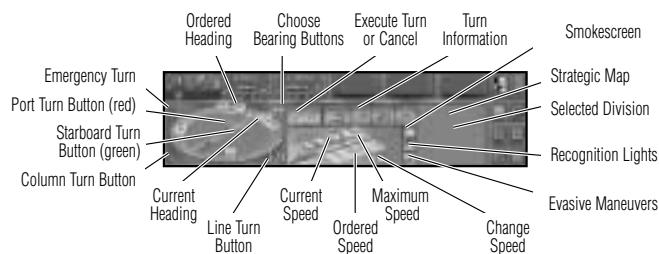
c) When you are satisfied with your turn order, click on the Execute Plot button to lock it in. Once a turn order is locked in, you may not change it, nor may you issue another turn order until the padlock disappears from the Navigation Panel. Press P to unpause the game, and watch the action unfold on the 2D map for a while. The camera icon on the map displays where the camera is on the 3D View screen.

d) Your ships are currently steaming at 20 knots (unless they've been damaged already). Let's increase speed. Click on the Speed Bar anywhere above 20. This is the new speed you have ordered. Your ships will gradually accelerate to that speed, but they will never go faster than the division's maximum speed.

11. You know enough to continue fighting the battle on your own. The battle will end when one side or the other is destroyed or when the time limit for the scenario expires. You may end the battle sooner by going to the F11 tab of the Function Bar or by pressing F11. Good luck, commander!

Tutorial II

1. Play Tutorial II after you have played Tutorial I. From the Main Menu, highlight and click on Play a Scenario.

2. On the Scenario Selection screen, scroll down and click on Tutorial II, then click on the Check button.

3. You will command the Japanese force in this night battle. Click on the Preferences button to open the Preference Settings screen. Make any changes you wish. You can also access this screen during play by clicking on the F4 tab

of the Function Bar or by pressing F4. Click on the Check button to close Preference Settings and return to the Player Options screen. Click on the Check button to proceed.

4. The Briefing Screen appears. You command two divisions. Division 1 consists of BC (battlecruiser) *Kongo* and CA (heavy cruiser) *Nachi*. Division 2 consists of three DDs (destroyers). Your force is on a bombardment mission, but you also need to deal with any enemy ships you encounter. Click on the Check button to proceed.

5. The 3D View screen appears. It's dark out there. Let's go to the Environment Panel to check on weather conditions. Click on the F6 tab of the Function Bar at the top of the screen, or press F6. The Briefing Screen appears. Click on the Environment button to open the Environment Panel. This panel lists the conditions for the battle. Current visibility is 40%, which is the best it can be at night. Radar Condition is 100%. Unfortunately, your ships do not carry radar, but some US ships do. Click on the Back button to return to the 3D View after you are finished.

6. Let's see where your ships are on the map. Click on the F1 tab of the Function Bar or press F1. Division 1 is in Column Formation, heading southeast. Division 2 is in Line Formation about 3,000 yards ahead of Division 1. Now let's look at what kind of armament your ships are carrying.

a) The Summary button should be highlighted. We're most interested in Main Guns and Torpedoes. Click on the Main Guns button to see a summary of the main guns for the currently selected division.

b) To see the summary for the other division, you need to switch divisions. To do this, click on the 1 or 2 button from the Division List below the Division Flag. You can also switch divisions by pressing 1 for Division 1 or 2 for Division 2 (etc., if you have more divisions).

c) After looking at each division's main guns summary, click on the Torpedoes button to see the torpedo summaries. Notice that your destroyers carry many torpedoes but relatively few (and relatively small) guns. When you're ready, press F1 to return to the 3D View.

7. Press P to unpause the game. If you're not already on Division 2, click 2 on the Division List or press 2. Division 2 is in the lead and will encounter the enemy in about a minute, so let's be ready. Press P when your observers start sighting enemy Contacts. This will pause the game, giving you time to issue orders.

a) Division 2 is in Line Formation. You'll want to be in Column Formation to fire your torpedoes. Click on the Navigation button and then the Orders button, or press N to bring up the Navigation Panel for Division 2.

b) Click on the Reform Column button in the bottom left corner of the Navigation Panel and click on the Turn to Port arrow in the middle of the compass ring on the left of the Panel. This automatically selects a simultaneous turn that will put Division 2 back into Column Formation on a compass heading of 30 degrees. Click the Execute Plot button to lock in this turn.

8.   Let's light up the scene with starshells. <u>Click on 1 in the Division List or press</u> 1
     <u>to select Division 1.</u>

     a) <u>Click on the Illumination button or press</u> I to bring up the Division
         Illumination Panel.

Principle Target   Second Target   Searchlights

Target Filters

Targeting Mode   Starshells   Targeting Mode
(searchlights)   (starshells)
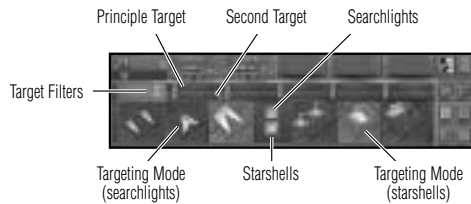
     b) <u>Click on the Starshell button</u> to highlight it.

     c) <u>Click on the Battleline targeting mode button.</u> Searchlights have a maximum
         range of 5,000 yards, so you don't want to use them yet. Starshells are only
         useful against targets over 4,000 yards distant. <u>Press</u> P <u>to unpause</u> the game.
         Watch the horizon for a while, and you'll see a starshell explode over the tar-
         get. It doesn't look like much at this distance, but that starshell will improve
         the accuracy of your gunfire.

9.   It's time to spring into action!

     a) <u>Start launching torpedoes from your destroyers.</u> Be sure to pick different tar-
         gets for each.

     b) <u>Open fire with your guns as well, for both divisions.</u> If you go to the 2D map
         screen, you'll see a yellow circle or two on the map – this indicates the area
         illuminated by your starshells.

     c) You'll probably want to <u>turn Division 1 so that it heads in a north to north-
         easterly direction.</u> Your mission objective is actually a Target circle many miles
         to the southeast, but you should deal with the enemy ships first.

10. Sometime when you have the game paused, <u>click on the F5 tab of the Function
     Bar, or press</u> F5 . The All Ships Screen appears. This screen displays an overview
     of each of your ships and all enemy ships that your force has sighted. <u>Press any
     key or click to return to the game.</u>

11. Damage to a ship's engines slow it down. A slow ship affects the other ships in
     the division because they decelerate to match the speed of the damaged one. You
     can detach a ship from a division by clicking on the broken chain icon below the
     Ship Box on the Division and Ship Panel. When you detach a ship, it forms a sin-
     gle-ship division of its own. You can now issue orders to it separately. You can
     never reattach a ship to its parent division. You have learned enough to finish the
     battle on your own. Good luck and enjoy!

■ GAME OVERVIEW

Historical Scenario Overview

FIGHTING STEEL includes 12 scenarios from 1939-1942 set in the Atlantic and Pacific
theaters of operations. Each scenario was carefully researched to give you an accurate
rendition of the real battle. The starting position of the ships and the weather condi-
tions are based on eyewitness reports. If a ship was in need of repair at the start of a
battle, its damaged condition is reflected in the setup data. For a full description of the
battles and their actual outcomes, see *Background to the Historical Scenarios* on page
101. However, because you make the decisions in the game, the outcome of your bat-
tles may be quite different from the historical ones.

Atlantic Ocean (British vs. Germans)

• River Plate, December 13, 1939. Three Royal Navy cruisers hound the "pocket bat-
  tleship" *Admiral Graf Spee* off the coast of South America.

• Norway Encounter, April 9, 1940. A pair of Kriegsmarine battlecruisers bumps into
  the *Renown* with her destroyer escort in bad weather.

• Denmark Straits, May 24, 1941. Recreates the famous engagement between the
  Bismarck and the *Hood* and *Prince of Wales*.

• Bismarck vs. The Destroyers, May 26, 1941. Five Royal Navy destroyers attempt to
  torpedo the already damaged *Bismarck*.

• Planned Rheinubung, May 25, 1941 (hypothetical). What if the *Scharnhorst* and
  Gneisenau had sortied to meet up with the *Bismarck* as originally planned?

• Barents Sea, December 31, 1942 (an entire battle scenario plus two additional sce-
  narios that cover separate phases of the battle). British destroyers and cruisers try
  to stop Kriegsmarine destroyers and cruisers from sinking Arctic Convoy JW-51B.

Pacific Ocean (Americans vs. Japanese)

• Savo Island, August 9, 1942. A Japanese cruiser force attacks a divided and unpre-
  pared Allied cruiser and destroyer patrol line at night.

• Cape Esperance, October 11-12, 1942. A radar-equipped, US cruiser and destroyer
  patrol crosses the T of a smaller Japanese force at night.

• Guadalcanal II, November 14-15, 1942. Four US destroyers and two modern, radar-
  equipped, battleships prepare to engage a large Japanese force at night.

• Tassafaronga, November 30, 1942. Can a Japanese destroyer force armed with
  deadly Long Lance torpedoes out-fight a US cruiser and destroyer force equipped
  with radar during a night battle?

Game Mode Overview

You may play a scenario in one of two modes: Standard or Division Commander.

Standard Mode

In single-player games, Standard mode allows you to control all of the ships on one side. You have complete access to those ships and all of the information they have gathered about the enemy.

In multiplayer games, Standard mode allows your team to control all of the ships on one side, and you know where your teammates' ships are and what information they have gathered about the enemy.

Division Commander Mode

A division consists of one or more ships that operate in a formal group. Most scenarios include several divisions per side.

In Division Commander mode, you and any other human players each control one division of ships. All divisions not controlled by human players are controlled by the program's AI, including any new divisions created during the battle when a ship detaches from its division due to battle damage or player choice. Furthermore, as a division commander, you have little or no information about the whereabouts of other friendly divisions that start outside your detection range. In other words, that new Contact your observers have sighted in the dark of night might be enemy or it might be friendly. Do you hold your fire, commander? Has he already sighted you? Do you risk switching on recognition lights to inform him what side you are on?

Campaign Game Overview

In the Campaign game, you manage a pool of ships through a number of turns, which are either weekly or monthly depending on the campaign you've selected. You choose the nation (navy) that you wish to play and the length of the campaign. You then receive a limited number of that navy's ships, with reinforcements arriving at a fixed schedule. From your pool of ships, you choose the ones to carry out a given mission each turn. You may leave ships behind in port to rest, but if you don't have an adequate force ready for a mission, you will lose Victory Points (VPs).

Each campaign turn may or may not result in a battle. The enemy side is randomly generated for each battle, but losses are tracked so that sunken ships do not return.

Any VPs you score in a campaign battle are credited to your campaign score. At the end of the campaign, you are rated on your accumulated VPs against the enemy's VPs. See the *Campaign Game* description on page 55 for more details.

Creating New Scenarios Overview

You may design your own scenarios from scratch with the Scenario Editor, or you may have the program create new scenarios for you with the Battle Generator.

Battle Generator Overview

The Battle Generator creates new scenarios for you based on a series of parameters that you input. These parameters influence the type and setting of the battle that is created, but you cannot choose which particular ships are involved or their initial placements. With the Battle Generator, you can create surprise encounters that more fully reflect the challenges faced by WWII commanders at sea. See the *Battle Generator* description on page 65 for further information.

Scenario Editor Overview

The Scenario Editor allows you to create new scenarios from scratch or edit existing ones. When creating a new scenario, you select the ships for each division, weather conditions, and other settings. You choose the starting positions for each division on the Editor's map. After saving the new scenario, it is ready to load from the Scenario Selection screen. See page 67 for more details on the *Scenario Editor*.

■ STARTING A GAME

Main Menu

The Main Menu screen appears after the opening sequence (to skip the sequence, press any key). From the Main Menu, click on a choice to go to that screen: Scenario, Campaign, Multiplayer, Scenario Editor, or Load Saved Game. Click on Exit to quit the game.

NOTE: Any reference to *click* in the manual refers to using the left mouse button.

Clicking on the Cancel button from any screen returns you to the Main Menu.

Scenario Selection

Choose Scenario from the Main Menu to start a single-player game. The Scenario Selection screen then appears. There are two scenario lists: click on the Book-and-Ship button to bring up the list of historical scenarios that are included in the game; click on the Pencil-and-Eraser button to bring up the list of scenarios you created through the Scenario Editor. Click on the scroll buttons to move through the list by line or page. Information about the highlighted scenario appears on the right-hand panel.

The flags indicate the two nations involved in the battle (the left-hand flag always represents Force A; the right-hand flag represents Force B). The number below each flag indicates the number of warship divisions that side has involved in the battle (transport divisions are excluded from this count). A division consists of one or more ships.

To proceed with the highlighted scenario, double-click on it or click on the Check button. Otherwise, click on the Battle Generator button to go to that screen and have the program create a new scenario for you.

Player Options Screen

After selecting a scenario from the list (or creating one with the Battle Generator), the Player Options screen appears where you choose the nation you wish to play, the difficulty level, and Standard or Division Commander mode. Highlight your choices by clicking on the desired icon. The flag on the left is Force A, while the flag on the right is Force B. To proceed, click on the Check button. You may also access the Preferences Settings from the Player Options screen. However, it is important to set your realism preferences before you start a game, because you may not change them during the game.

Difficulty Level: Highlight the button for Ensign (one-stripe), Lieutenant, Captain, or Admiral (four-stripes). Admiral-level is hardest. Difficulty level affects your chances to detect and damage the enemy as well as the enemy's chances to detect and damage your ships.

Game Mode: Highlight the Commander's Cap button to play in Division Commander mode or the Ships button to play in Standard mode. In Standard mode, you command all of the ships on one side. In Division Commander mode, you command only one division and the program's AI controls the others.

Preference Settings: Click on the Telegraph button to go to the Preference Settings screen (for complete information about *Preference Settings*, see page 49). Leaving that screen returns you to Player Options.

Scenario Launch Screen

The Scenario Launch screen appears after proceeding from Player Options. You may return to Player Options by clicking on the Back button. The text display at the top of the screen identifies the scenario's name, date, and the following information:

Begins: Time of day the scenario starts (expressed in 24-hour military time).

Ends: Two ending times are listed. The scenario may randomly end at the first time, 15 minutes later, or at the final listed time (which is 30 minutes after the first time).

Mission: Type of mission your side is on, which is based on the type of battle being fought. Each side (also called force) has a different mission for any given battle type. See page 73 for more information about *Battle Types and Missions*.

BATTLE TYPE	FORCE A MISSION	FORCE B MISSION
Meeting Engagement:	Battleline	Battleline
Bombardment:	Bombarding Force	Defending Force
Convoy:	Escorting Force	Attacking Force
Intercept:	Intercepting Force	Evading Force
Tactical Transport:	Transporting Force	Patrolling Force

Mission Objective: What your side should try to accomplish in the battle.

Location: Hemisphere and ocean.

Air/Sea Control: Which force controls the waters where the battle occurs. Air/Sea Control has a significant impact on the survival of ships (especially damaged ones) after the end of the battle but before final victory is determined. Air/Sea Control is defined as None (no effects), Contested (all ships subject to additional damage), or one force (the other force's ships are subject to additional damage).

Disengagement Heading: To leave the battle (disengage from it), your ships should head in a direction that falls on or within the Disengagement Heading until they are no longer in contact with enemy ships, at which point they automatically disengage. **Note** You cannot disengage during the first 20 minutes of any scenario.

VP Modifiers: Multipliers to Victory Point calculations, usually to balance the scenario for victory purposes. Some historical scenarios have a set VP modifier for a given side. In scenarios created by the Battle Generator, the VP modifiers are based on the difference in size between the two forces, as determined by ship type and number. In battles you design with the Scenario Editor, you may set the VP modifiers yourself.

Scenario Launch Screen

Mission Text

Computer Controlled Division

User Controlled Division

Divisional Flagship

Camo Scroll Button

Start Button

Go Back to Previous Screen   Cancel
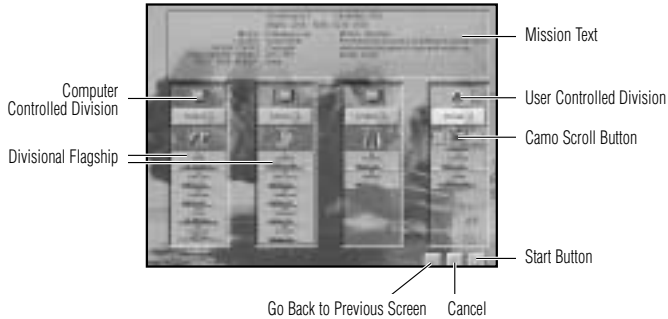
Division Selection

The division display at the bottom of the Scenario Launch screen shows all of the warship divisions available to your side. Clicking on any ship in the division will select and highlight that division. A pennant flag with the division's number appears by the flagship of each division. If the division includes more ships than those shown, click on the scroll buttons to move through the list.

In Division Commander mode, the highlighted division always displays the Commander's Cap, indicating that you currently control that division while the program controls the others, which are indicated by computer-monitor icons (however, you may not select a transport division to command).

Highlighting a division allows you to change the camouflage scheme of that division's ships. Click on the camo scroll buttons to cycle through the swatch list of camo schemes.

When you click on the Check button, you begin play with the division you have highlighted. See *Playing the Game* on page 19.

Multiplayer Game

From the Main Menu, click on Multiplayer to start or join a multiplayer game. A multiplayer game may accommodate two to four human players. Type in your player name in the first screen. Press **Enter** or click the Check button to proceed.

• Select TCP/IP Internet to play over the Internet.

• Select IPX to play on a Local Area Network (LAN).

If a connection type is not available, it is grayed out.

• Select Create if you want to host a new game

• Select Join if you want to join someone else's game.

If you join by way of a TCP/IP connection, a screen appears for you to enter your Host IP address. Once a connection is made, whether by TCP/IP or IPX, the Select Session screen appears listing all sessions that are currently open to new players. Click on a session to select it, then click on the Check button to proceed to that session's Lobby Area screen.

Host Create Screen

To create a new session, you must first type in a session name for it. Press **Enter** or click on the Check button to proceed to the Host Create screen.

Battles Created with Scenario Editor · Standard Mode
Historical Scenarios · Division Commander Mode
List of Scenarios · Scenario Description
Force A Nationality · Cancel
Force B Nationality · Start Game
Starting Number of Warship Divisions for Force B · Preference Settings
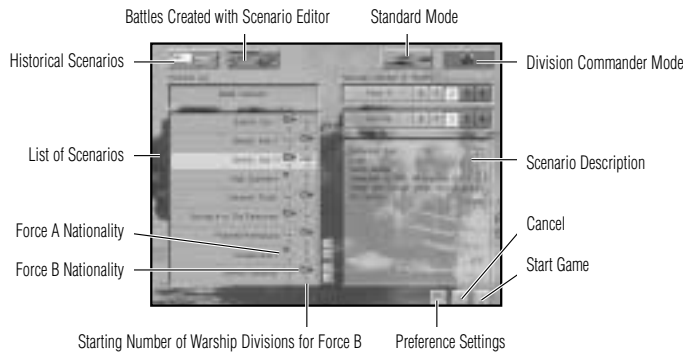
Mode: In the Host Create screen, choose to play in Division Commander mode (each player controls one division only) or Standard mode by highlighting the Commander's Cap or the Ships button respectively.

Number of Players: Select the number of human players you want for each side. The current number selected is highlighted. A game may have no more than 4 players total. To increase the number of players on one side, you may have to decrease the number of players on the other side first. The total number of players selected determines what scenarios are available on the lists. For example, if you set the game for 4 players, the River Plate scenario will not appear on the historical scenario list because it only has 3 divisions (2 British and 1 German).

Scenario Lists: There are two scenario lists to choose from, or you may use the Battle Generator to design a new scenario (for information about the *Battle Generator*, see page 65).

• Book-and-Ship button displays list of historical scenarios that come with the game.

• Pencil-and-Eraser button displays list of battles you created with the Scenario Editor (see page 67).

The flags show the nations involved in a given battle, with Force A always displayed on the left. Numbers under the flags indicate the starting number of warship divisions that side has in the battle. If the list is long, use the scroll buttons to move through it. A description of the highlighted scenario appears in the text panel to the right.

Preference Settings: Click on the Telegraph button to go to the Preference Settings screen (see page 49 for a full description of *Preference Settings*).

Proceed: Click on the Check button to start the game with the highlighted scenario.

Lobby Area Screen

The Lobby Area screen provides more details about the current session and allows players to choose sides and review the game's Preferences set by the host player. See *Scenario Launch Screen* on page 15 for a description of the text information displayed at the top of the Lobby Area Screen.

When you first enter the Lobby Area screen, your player name appears in the Unassigned Players list. Click on any position you want to occupy in the player slots to move your name out of the Unassigned list. You can change positions with another player until the game starts.

All players may review the Preferences that the host chose for the scenario, but only the host may change those settings.

Cancel: You may exit the session by clicking on the Cancel button. If the host player exits, the session ends and all players are dumped back at the Main Menu screen. If a non-host player exits, the session continues. A player who exits may return to the session if he retraces his multiplayer choices before the host player launches the session.

Proceed: The host player may launch the game by clicking on the Check button, at which point each team's members automatically proceed to their Team Huddle screen.

Team Huddle Screen

The Team Huddle screen works almost identically to the Scenario Launch screen found in single-player games – see *Scenario Launch Screen* on page 15. However, each division also has a player name. When team members enter the screen, they are assigned divisions. In Standard Mode, players may control more than one division.

To take control of a division click on a ship of the division you want to command. Any player may start the game by clicking on the continue button (you may have to wait for the other team before loading is complete). The division you have highlighted is the division you start the game with.

Chat

You may chat with other players in the Lobby Area and Team Huddle screens and during game play. Press **Enter** to compose a message to your teammates in Team Huddle or game play, or to all players in the Lobby Area screen. Press **Shift-Enter** to compose a message to all players during game play or Team Huddle.

After composing a message, press **Enter** to send it.

Press ⁄ (forward slash) to clear a chat message.

Press . (period) to scroll the chat messages down.

Press , (comma) to scroll the chat messages up.

Pause

Pausing the game in play pauses the game for all players. The game resumes as soon as the player who paused the game presses any key or the mouse. No players can enter orders in multiplayer games while the game is paused.

Load Saved Game Screen

You may save a single-player game in progress using the Save Game feature. If you have the Auto Save preference on, the game is automatically saved for you at regular intervals.

To retrieve a saved game, click on the Load Saved Game line of the Main Menu. The Load Game screen then appears.

In the Load Game screen, click on the Campaigns button to show a list of Campaign games you have saved, or click on the Scenarios button to show a list of the Scenario games you have saved. Click on a saved game to select and highlight it. Click on the scroll buttons to move up or down through the scenario list a page or line at a time.

To return to the Main Menu, click on the Cancel button. To load a highlighted game, click on the Load button in the bottom right corner of the screen. To select the last save recorded by the auto save feature, click on the Auto Save button.

■ PLAYING THE GAME

When a battle begins, the 3D view screen appears. You may play the game on either the 3D view screen or the 2D map screen, or you may switch back and forth between the two as you desire. To switch between 2D and 3D views, press the F1 key or click on the first tab under the Function Bar (for a description of the *Function Bar*, see page 45).

To the right of the 3D view screen is a Camera Control Panel. You can make selections here to change your point of view in the 3D world. Likewise, on the 2D screen, a Map Control Menu appears to the right of the 2D map. Selections from the Map Control Menu change what appears on the 2D map.

Across the bottom of both the 2D and 3D screens is the Division and Ship Panel display. This is where you issue orders to your forces and check on their status.

3D View Screen Overview

You can switch from 2D to 3D view by pressing the F1 key or by clicking on the first tab of the Function Bar. The 3D screen has the same Division and Ship Panel at the bottom of the screen as the 2D screen. If you press F2, this panel disappears and the 3D view fills up the entire screen. Press F2 again (or use the F2 tab of the Function Bar) to go back to the half-screen 3D view.

Primary I. D. Tag
Game Clock
Game Speed
Camera Control Panel
Manual Camera
Ship/Division View Toggle
Camera Selection Button
Previous/Next Buttons
Auto Camera On/Off
Secondary I.D. Tag
I.D. Tag Selection
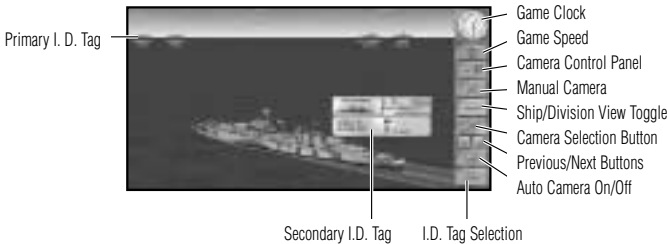
Clock and Game Speed

At the top right of the 3D screen are the Clock and Game Speed icons. The Clock shows the current time in the scenario. As soon as you unpause the battle (press P), the clock starts ticking.

Below the Clock, the same icons that are used on the F9 tab of the Function Bar show you the current game speed (or paused) setting. To change the game speed setting, click on the button and a window pops up. Click on the game speed icon you want to select it and close the window:

• Pause (anchor) – *you may still issue orders to your ships when the game is paused.*

• Normal

• Fast

• Faster

• Turbo

Camera Control Panel

Below the Game Speed icon is the Camera Control Panel, which allows you to control the 3D view. To open or close the panel, press the F3 key or click on the F3 Function tab. You can also open it by moving the mouse to the right hand side of the screen while in 3D view.

Close Button

You may also close the Camera Control Panel by clicking on the X button.

Manual Camera On/Off

Default setting is off. When on, Manual Camera gives you complete control of the camera's positioning and view. You can move the camera around the 3D world by key press to watch events from almost any vantage. However, if you have selected Restricted 3D Camera under the Realism Preferences (see page 51), then Manual Camera is disabled.

In Manual Camera mode, the other buttons on the Panel are disabled except for Close Panel and the ID Tag Selection. Auto Camera Events are ignored while Manual Camera is on.

See *Camera Modes* on page 22 for a list of the keys that control the Manual Camera.

Ship/Division View Toggle

This toggle changes the way the camera system decides where the center of the scene is positioned. The default setting is Division View. With this setting, the camera is positioned in such a way as to show all of the division's ships on the screen.

If you toggle it to Ship View setting, the camera uses the middle of the current friendly ship as the focus of the view. The current ship will either be the division's flagship if you are on a Division panel, or the selected ship if you are on a Ship panel.

Camera Selection Button

Look Thru
Enemy Track
Target Track
Top Down
Semi-Free
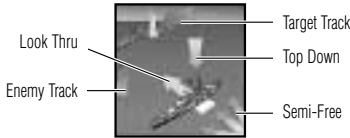
Click on this button to select the current camera mode (the default mode is *Semi-Free*). A window pops up from which you may select one of five camera modes. Click on the arrow of your choice. The window automatically closes, and the icon on the Camera Selection button shows your current choice. See *Camera Modes* on page 22 for complete details.

• **Look Thru** (yellow arrow)
• **Enemy Track** (purple arrow)
• **Semi-Free** (triple green arrows)
• **Target Track** (red arrow)
• **Topdown** (orange arrow)

Previous/Next Buttons

Use these buttons to move the camera between previous and next camera targets or to revolve your camera in 45-degree increments, depending on your camera mode – see *Camera Modes* on page 22 for full details.

Auto Camera On/Off

Default setting is On. When on, the Auto Camera moves the camera to display significant events as they occur. Text messages also appear to describe the events. You may

select the type of events you want the Auto Camera to display by going to the Camera tab of the Preference Settings (see *Camera Settings* on page 49 for exact details). Some of the auto-camera events are disabled if you chose Restricted 3D Camera under the Realism tab of Preferences.

ID Tag Selection

When you click on this button, a window pops up from which you may select one of three ID Tag options. (See *Ship ID Tags* on page 30 for a full description of tags.)

• ID Tags are displayed for both sides' ships. This is the default setting.

• Only Enemy (and Unidentified in Division Commander mode) ID Tags are displayed.

• No ID Tags are displayed.

Camera Modes

There are eight camera modes you control or activate. Manual mode gives you complete control of the camera; the other modes focus on different ships (if you have camera set to Ship) or divisions (if set to Division). You can manipulate the camera in each mode by pressing certain keys. The function of a camera key is multiplied if you hold down the ⑤ or ⑥ while pressing the key:

⑤-[key]: Camera adjustment equals 5 steps of the key press.

⑥-[key]: Camera adjustment equals 20 steps of the key press.

Manual Camera

Manual mode can be toggled on the Camera Control Panel. Manual camera moves only in response to your key presses. The highest a Manual Camera will go is 5,000 meters above the sea. Its vertical pitch angle can rotate through 360 degrees.

Manual Camera Keys

↑ ↓ – move the camera position forward/back.

← → – rotate camera left/right.

Ⓤ Ⓨ – move the camera position to greater/lesser height.

Ⓘ Ⓓ – change the camera's vertical pitch up/down.

Ⓗ Ⓙ – move camera position right/left.

Look-Thru Camera

Yellow arrow on Camera Selection pop-up. Positions the camera behind the current ship/division and points the camera at a target ship of the current ship/division. The Previous/Next buttons on the Camera Control Panel step through the target list for the ship/division and change the camera view to the appropriate position.

A target list is maintained for the current ship/division as follows: Main Gun Targets, Secondary Gun Targets, and Torpedo Targets. Illumination targets are not included. If the target list is empty, the camera takes a position behind the current ship/division.

Look-Thru Keys

⌨t⌨ / ⌨s⌨⌨t⌨ – next/previous target ship.

Target Track Camera

Red arrow on Camera Selection pop-up. Target Track is essentially the same as the Look-Thru mode except that the camera is positioned close to the target ship to maximize the view of the target. Consequently, your ship/division is usually not visible. The Previous/Next buttons step through the target list for the ship/division and change the camera view to the appropriate position.

A target list is maintained for the current ship/division as follows: Main Gun Targets, Secondary Gun Targets, and Torpedo Targets. Illumination targets are not included. If the target list is empty, the camera takes a position behind the current ship/division.

Target Track Keys

⌨t⌨ / ⌨s⌨⌨t⌨ – next/previous target ship.

Enemy Track Camera

Purple arrow on Camera Selection pop-up. Enemy Track mode positions the camera in a revolving orbit close to a visible enemy ship to maximize the view of the target. Your own ship/division is usually not visible in this view. The Previous/Next buttons step through the list of enemy ships for the ship/division and change the camera view to the appropriate position.

A target list is maintained for the current ship/division of all enemy contacts, ranked in range order. Only ships visible to the ship/division can be viewed in this mode. If the target list is empty, the camera takes a position behind the current ship/division.

Enemy Track Keys

⌨t⌨ / ⌨s⌨⌨t⌨ – next/previous target ship.

Topdown Camera

Orange arrow on Camera Selection pop-up. The camera is positioned above the friendly ship/division and pointed straight down at it. The camera cannot be pitched up or down, and is constrained to move parallel to the water and zoom in/out.

You may not move the camera more than 2,500 yards from a ship in the current division when the Restricted Camera preference is on.

Topdown Keys

↑↓ – move the camera position forward/back.

←→ – rotate the camera counter-clockwise/clockwise.

u y – move the camera position to greater/lesser height.

h j – move camera position right/left.

Semi-Free Camera

Triple green arrows on Camera Selection pop-up (this is the default setting). The camera position is tied to the current ship/division, but you may adjust the camera offset from the ship/division. You may also rotate and zoom the camera. This works the same as the Manual camera except that the camera's position is constantly updated to maintain its position relative to the current ship/division. The Previous/Next buttons on the Camera Control Panel revolve the camera around its focus point by 45 degree increments.

You may not move the camera more than 2,500 yards from a ship in the current division when the Restricted Camera preference is on.

Semi-Free Keys

↑↓ – move the camera position forward/back.

←→ – rotate camera left/right.

u y – move the camera position to greater/lesser height.

l D – change the camera's vertical pitch up/down.

h j – move camera position right/left.

⌨t⌨ / ⌨s⌨⌨t⌨ – revolve camera right/left around its focus point by 45 degree increments.

Navigation Plot Camera

This mode overrides your current camera mode to facilitate the navigation order entry. Upon completion, the view is returned to the previous settings. This mode is always an Immediate transition. The camera pulls back and changes angle to show the maneuver you have plotted.

You can disable this mode in the Camera options tab of the Preference Settings screen. In Manual camera mode, this is disabled.

Torpedo Attack Plot Camera

This mode overrides your current camera mode to facilitate the torpedo attack order entry. Upon completion, the view is returned to the previous settings. This mode is always an Immediate transition. When torpedoes are launched, the camera moves to view the firing sequence, and pans in the firing direction to show where the spread is going.

You can disable this mode in the Camera options tab of the Preference Settings screen. In Manual camera mode, this is disabled.

Camera Transitions

You can set the camera transitions to Fluid, Immediate, or Automatic in the Camera options tab of the Preference Settings screen.

• A Fluid setting slides the camera in increments from one position to the next.

• An Immediate setting jumps the camera to the new location.

• An Automatic setting always uses fluid transitions when moving less than 4,000 yards; otherwise, it uses immediate.

2D Map Screen Overview

Friendly Flagship   Enemy Ships   Game Clock

Game Speed
Mapping Mode Padlock
Scroll Compass
Zoom Level
Auto Plot
Map Display

Grid Scale

Compass

Map Scale

Camera Location   Range Circles   Map Grid
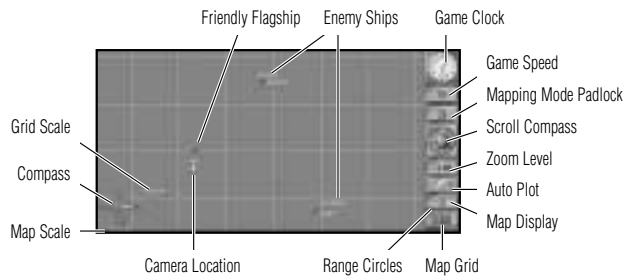
The 2D map is oriented with North always at the top. In the lower left-hand corner of the 2D map, a compass is available as an aid to plotting. Below the compass is the nautical miles (nm) indicator that shows the length by width of the visible map area (a nautical mile is 2,000 yards). Ships appear on the 2D map as icons (the size of the icons depends on the current zoom level). Blue icons represent friendly ships or divisions; red icons represent enemy ships or divisions. Flags denote division flagships. At higher zoomed out levels, a single icon represents an entire division. A camera icon on the map indicates the location and facing of the camera on the 3D screen.

Below the map is the Division and Ship Panel display. This portion of the screen remains the same when you switch between 2D and 3D views.

The 2D Map Control Menu appears to the right of the map. For a description of the *Clock and Game Speed* setting, see page 20.

2D Map Control Menu

The 2D Map Control Menu bar on the right-hand side of the 2D screen contains information about the 2D map. The selections you make on this menu determine what is displayed on the map.

Mapping Mode Padlock

A locked or unlocked padlock indicates the current Mapping Mode selection.

Locked: When the Mapping Mode is locked, the 2D map is set at the maximum zoom-out required to show all ships currently visible or known to you. For example, if you are playing in Standard mode (not Division Commander mode), all friendly ships are always shown. If the divisions are too widely spaced to appear together on the screen, the map centers on the flagship of the currently selected division and shows as many other divisions as possible at the maximum zoom out level.

Unlocked: Click on the locked padlock to unlock it and enable the free mapping mode. In free mapping mode you can use the *Scroll Compass* to move around the map. In free mapping mode, whenever you shift to a new division, the map automatically cen-

ters itself over the flagship of the new division. Another way you can get to free mapping mode is by clicking on the *Zoom Level* button and selecting a different zoom level. This automatically unlocks the map.

Scroll Compass

The Scroll Compass allows you to move around the 2D map in any of the four cardinal directions by clicking on the scroll arrows. It is only available if the padlock icon is unlocked.

The outer, gold, double arrows let you make big jumps round the map.

The inner, bronze, single arrows allow for smaller map jumps.

If you click on the center x, your currently selected division is centered on the screen.

For continuous scrolling, hold down the left-hand mouse press instead of clicking.

Zoom Level

To zoom in or out on the map, click on the Zoom Level button and a popup appears. A series of icons and ships represents the zoom levels. Click to the right of the scale to zoom in and to the left to zoom out. Zoom levels differ between night and daytime battles.

Auto-Plot

Auto-Plot allows you to quickly enter a new course for the currently selected division. Auto-Plot is only available on the 2D screen. When you click on the Auto-Plot button, the Navigation Panel appears at the bottom of the screen if it is not already open.

Click on any point on the map that you want to be the new heading for your selected division. The new heading automatically appears on the 2D map and on the Navigation Panel, but you must still click on the Execute Plot button of the Navigation Panel to implement the maneuver. See *Navigation Panel* on page 39.

Auto-Plot is unavailable if your selected division is in a turn (you cannot set a new maneuver until the lead ship has completed its current maneuver). The icon on the panel highlights when it is possible to use Auto-Plot again.

Divisions maneuver in such a way as to maintain their current formation when given orders through Auto-Plot (that is, ships in Column Formation plot a column turn, while ships in Line Formation plot a simultaneous turn). You can override an auto-plotted course by making changes on the Navigation Panel, providing you haven't already clicked the Execute Plot button.

When you leave the Navigation Panel for a different one, Auto-Plot is automatically switched off, but it is turned on again if you return to the Navigation Panel. If you had set a new heading, that heading is still plotted.

Range Circles and Map Display Info

There are two icons in the space below the Auto-Plot button: a green circle and an orange arrow. Click on the green circle icon to open a pop-up window for Range Circles; click on the orange arrow icon to open a pop-up window for Map Display Info.

Range Circles Window

Secondary Gun Max Range

Main Gun Max Range | Torpedo Max range

Cruiser Initial Contact Ranges

Battleship Initial Contact Ranges

Destroyer Initial Contact Ranges

Current Ship Filter

All Enemy Ships and Unidentified Ships Filter

All Ships Filter Button

Close Pop-Up Window

Selected Division Filter | All Friendly Ships Filter
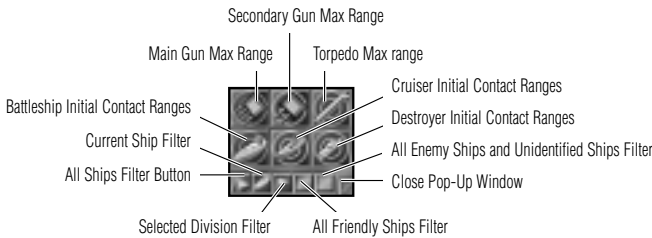
In the Range Circles pop-up window, click on a button to toggle it on (highlight) or off. When a button is toggled on, circles of the appropriate color are displayed on the map to show the ranges for the ships you have selected using the Filters buttons at the bottom of the pop-up (see *Filter Buttons* on page 29).

Click on the X button to close the pop-up window.

Weapons Ranges

• Main Gun Max Range (white circles). Shows the maximum range of the ship's main guns, even if all of its main guns are knocked out.

• Secondary Gun Max Range (gold circles). Shows the maximum range of the secondary guns (if the ship carries any), even if all of its secondary guns are knocked out.

• Torpedo Max Range (aqua circles). Shows the maximum range of the torpedo type carried by that ship, whether any torpedoes remain on board the ship or not.

Note: These three types of weapons information are only displayed for an enemy ship if the information level you have for it is Name level.

Initial Contact Ranges

• Battleship Initial Contact Ranges. Visual limit is shown with red circles, radar limit with dashed red circles. The circles show the ranges that the observing ship will initially detect battleships. (Battlecruisers are treated as battleships for sighting purposes.)

• Cruiser Initial Contact Ranges. Visual limit is shown with yellow circles, radar limit with dashed yellow circles. The circles show the ranges that the observing ship will initially detect cruisers or transports.

• Destroyer Initial Contact Ranges. Visual limit is shown with green circles, radar limit with dashed green circles. The circles show the ranges that the observing ship will initially detect destroyers.

The circles represent initial contact. When you are looking for a contact on the horizon, it often takes a while before you can spot anything. The contact may be a little nearer than maximum visibility allows for when you actually spot it, so the circles rep-

resent 90% of your standard detection range. Once you have spotted a contact and know where to look, you can still see it, even if it moves to the point of maximum range, which is 110% of your standard detection range.

Your ship's radar range depends on type of radar, quality, and current radar conditions. The enemy's radar ranges are never shown.

Note: An enemy ship's observing ranges are only shown if the information level you have on that ship is Type or Name level. During night battles, the ranges given for enemy observers assume they have average night fighting ability, so their true observation range may be more or less.

Map Display Info

Projected Paths Displayed Button | Projected Path Based on Time Increments

Enemy Ships Firing

Torpedo Cones

Friendly Ships Firing

Smoke Screens Displayed

Ship Names Display Button

Close Pop-Up Window

Filter Buttons
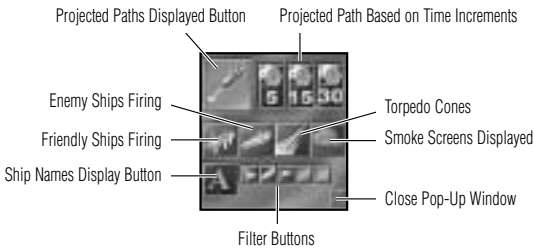
The second icon, an orange arrow, opens up the Map Display Info pop-up window. From this window, you can toggle on and off Projected Path, Friendly Ships Firing, Enemy Ships Firing, Torpedo Cones, Smokescreens, and Ship Names on the 2D map. Use the Filters buttons at the bottom of the pop-up window to select which ships you want to display this information.

Click on the X button to close the pop-up window.

Projected Paths Displayed: The Projected Paths display shows the predicted paths of the selected ships on the 2D map. When the Projected Paths is first toggled on, the 15 button is also highlighted, and the paths are shown out to 15 minutes into the future. Changing the time to 5 or 30 alters the number of minutes into the future the Projected Paths are displayed. You can also turn on the Projected Paths by clicking on the 5, 15, or 30 minute time indicator buttons.

Enemy projected path lines follow the current heading of the enemy ships and do not account for turns. In real life, you cannot predict when an enemy ship will turn. Your own ships' projected path lines reflect maneuvers in progress.

Friendly Ships Firing: Toggle this button on to show which targets your ships are firing at. Dashed white lines appear on the 2D map displaying the path of gunfire from each selected friendly ship to each target it is firing at. This shows the path of all gunfire from main and secondary guns. Use the Filters buttons at the bottom of the pop-up to select which ships you want this information for.

Enemy Ships Firing: Toggle this button on to reveal which enemy ships are firing upon your ships. Dashed red lines show the path of gunfire from each firing enemy ship to its target. This shows the path of all gunfire from main and secondary guns. Use the Filters buttons at the bottom of the pop-up to select which ships you want this information for.

Note: When both shooting icons are on, a candy cane effect occurs when ships are firing at each other.

Torpedo Cones: When toggled on, the Torpedo Cones button displays cones for friendly torpedo spreads already in the water (arguably, "friendly torpedo" is an oxymoron). The cone shows the area that the torpedo spread will cover during its remaining run time. The current position of the torpedo spread is represented by a line eating into the cone.

Cones are displayed for all friendly spreads if you are playing in Standard mode. In Division Commander mode, only spreads fired by your own division are displayed. Enemy torpedo cones are never displayed.

No matter how the Torpedo Cones button is set, when you select a torpedo target for a ship in the Torpedo Panel, a cone appears on the 2D map showing the area the torpedoes will cover if fired. This cone remains displayed as long as one of the ship's torpedo tube mounts is targeted on the panel, but will be removed if you leave the Torpedo Panel without firing (or fire the torpedoes and the Torpedo Cones button is off).

Smokescreens Displayed: Toggle the Smokescreen button on to display where smokescreens are in effect on the 2D map (the default setting for this button is On).

Ship Names Displayed: Toggle the Alpha button to turn on or off the ship name tags on the 2D map (the default setting for this button is On).

Filter Buttons for Range Circles and Miscellaneous Features

Filter buttons appear on both the Range Circles pop-up window and the Miscellaneous Features pop-up window. The information displayed through each of these pop-up windows can be filtered for specific ships or divisions by using the Filter buttons. The filters have a cumulative effect, so you may toggle on more than one at a time.

• From the left, the first Filter button toggles on the information for all ships, friendly and enemy.

• The second button toggles on the information for your currently selected ship.

• The third button is for your currently selected division.

• The fourth button shows the information for all friendly ships.

• The fifth button filters for all enemy ships and unidentified contacts.

The filter selection is the same on both pop-ups, and when changed on one popup, it automatically changes on the other pop-up so that they display information for the same selected ships.

When playing in Standard mode, you have access to information from all friendly ships. However, in Division Commander mode, you only have access to the information from ships in your division.

Map Grid

At the bottom of the Map Control Menu is a Map Grid button. Click on this to open a pop-up window. You may select from the grids on the pop-up to place a different-sized grid overlay on the 2D map. The grid allows you to plot your course with greater precision and helps you to see the position of your ships in relation to the enemy. The scale of the grid you are using is shown in white figures on the 2D map.

Ship ID Tags

Primary ID Tags

Primary ID (Identification) Tags are displayed whenever you move the mouse cursor over a ship in the 2D or 3D views. Moving the cursor away from the ship makes its tag disappear. You can also toggle Primary ID Tags on permanently (for enemy ships or for all ships) on the Camera Control Panel. Red ID tags represent enemy or unidentified ships; blue tags represent friendly ships.

A Primary ID Tag displays three pieces of information about the ship. The information is based on the Target Information Level, of which there are three: Contact, Type, and Name.

Contact Level

This is the first and lowest level of information. Your observers have only just sighted the ship, either visually (binocular icon) or by radar (radar antenna icon). You know nothing more about the ship other than it is a contact at a certain range from your ship (distance is indicated in yards). Your chance of hitting a contact with guns or torpedoes is reduced by 50%.

As time progresses, your observers gain more information about the contact, raising it to the next information level: Type.

Type Level

Your observers have now judged the type of ship it is. The Primary ID Tags list four types of ships, but there are actually six types in the game (see *Ship Types* on page 71 for more details).

BB: battleship, the largest warships in a fleet. For Type level, this includes BCs (battlecruisers).

CA: heavy cruiser, smaller than BBs or BCs but larger than DDs. For Type level, this includes CLs (light cruisers).

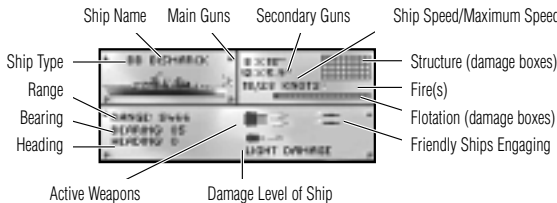**DD:** destroyers, the smallest and fastest warships in a fleet.

TR: transports, unarmed merchant and transport ships.

Your chance of hitting a Type level target with guns or torpedoes is reduced by 25%.

Name Level

Your observers have watched the ship long enough to completely identify it. This is the highest information level. Your guns and torpedoes are most effective when firing on an enemy Name level target.

Secondary ID Tags

Ship Name Main Guns Secondary Guns Ship Speed/Maximum Speed

Ship Type — Structure (damage boxes)
Range — Fire(s)
Bearing — Flotation (damage boxes)
Heading — Friendly Ships Engaging

Active Weapons Damage Level of Ship

If you move your cursor over a ship's graphic or Primary ID Tag in game play and hold the left mouse press down, a Secondary ID Tag pops up over the Primary ID Tag. The Secondary ID Tag remains open until you release the mouse press. Similarly, if you move your cursor over a Ship Box in the Division and Ship Panel or a Target List Box in any of the Single Ship Panels and hold the right mouse press down, a Secondary ID Tag pops up for that ship and disappears when you release the mouse press.

Like the Primary ID Tag, the Secondary ID Tag is strictly for information display. There are no buttons or items to select or change on this pop-up.

The Secondary ID Tag provides the following information about the ship if known to your forces.

Type: BB, BC, CA, CL, DD, or TR.

Name: long names are abbreviated.

Generic Profile: based on Type. Other icons might be displayed as well:

• Flagship pennant (friendly only)

• Radar contact (enemy only)

• Smoke (a white cloud indicates that the is ship laying smokescreen)

• Evasive maneuver (ship has Evasive Maneuver selected)

• Turn limited (an orange arrow indicates the ship's steering is jammed – friendly only)

• Speed limited (a red arrow indicates the ship is slowing down its division – friendly only)

• Recognition lights (when turned on at night, displays the ship's nationality – Division Commander mode only)

• Encumbered (ship in Tactical Transport mode – friendly only)

Main Guns: current number and bore size of ship's operable main guns.

Secondary Guns: current number and bore size of ship's operable secondary guns.

Speed: ship's current speed/current maximum speed (expressed in knots).

Structure: green are undamaged, red are damaged. Each box represents 2% of the ship's structure. When all boxes are damaged, the ship goes out of action.

Fires: level of fire on board ship.

Flotation: each box represents 5% of the ship's Flotation Point system. When all boxes are flooded, the ship begins to sink.

Range: distance in yards from your ship.

Bearing: direction the ship is from your ship, expressed in compass degrees (0 degrees is North, 90 degrees is East, 180 degrees is South, and 270 degrees is West).

Heading: direction the ship is moving, expressed in compass degrees.

Friendly Ships Engaging: number of friendly ships in selected division firing main or secondary guns on that target.

Active Weapons: displays whether the ship is firing its main and/or secondary guns.

General Status: indicates the general damage level of the ship: No damage, Light damage, Medium damage, Heavy damage, Out of action, Sinking, or Sunk.

Division and Ship Panel

The division is the basic fleet unit in FIGHTING STEEL. A division may comprise 1-10 ships. Each side starts with 1-4 divisions (however, no side may have more than 14 ships, and no scenario can have more than 20 ships total).

At any time you may detach a ship from a division, thus creating a new single-ship division. In some cases, a damaged ship will automatically detach itself from its parent division and become an independent division (for instance, its rudder is jammed and it cannot turn when the rest of the division is ordered to turn).

Division Selection Bar

To issue orders to or to check on the summary of a division, you must first select it on the Division Selection Bar. The number in the Division Flag indicates the currently selected division. To switch to another division, click on another division's number from the list below the flag. If you have more than five divisions, scroll buttons appear allowing you to page through the division list.

When playing in Division Commander mode, you control only one division and you may not switch divisions.

When playing a multiplayer game in Standard mode, you cannot switch to a division controlled by another player. You cannot select such divisions from the division list.

When the current division is turning, a broken green arrow appears by the Division Flag icon to indicate this. If the current division has Evasive Maneuver selected, a curvy green arrow appears in that location.

Ships in Current Division

The first five ships of the current division are displayed in Ship Boxes to the right of the division flag. Ships appear in column order, with the leading ship in the left-hand box. If the division includes over five ships (it never includes more than ten), scroll buttons appear allowing you to display the second section of ships in the Ship Boxes.

Each Ship Box contains some or all of the following information and icons:

Type: BB, BC, CA, CL, DD, or TR.

Name: ship's full name.

Ship Icon: matches the ship type.

Flagship Pennant: the division's flagship displays a small flag on the stern.

Recognition Lights: a light icon indicates the ship has its national recognition lights on at night (Division Commander mode).

Speed Limited: a red arrow indicates the ship is slowing down its division – friendly only.

Turn Limited: a curving orange arrow indicates the ship's rudder is currently jammed.

Smoke: a white cloud indicates the ship is laying a smokescreen.

Detaching a Ship
A ship can be detached from a division voluntarily to become an independent unit. A ship is automatically detached if the division makes a turn that it cannot maintain. A ship is not detached for reason of speed loss; instead, the division automatically decelerates to match the speed of the ship so that it remains in formation. When a ship detaches and creates a gap in the formation, the remaining ships automatically close up as best they can.

A detached ship forms a single-ship division that can never reattach to its parent division or to any other division.

In multi-ship divisions, a broken chain icon appears below each ship box. To detach a ship from the division, click on the ship's broken chain and a pop-up window appears.

Detach Confirmation: Click on YES to confirm that you want to detach the ship or click on NO to cancel. You retain control of the detached ship in Standard mode, but it now operates as a single-ship division. In Division Commander mode, the program's AI takes control of the ship and it is no longer part of your division.

Division Button Box
The Division Button Box is located on the right-hand side of the Division and Ship Panel. The button box includes two filter buttons at the top – Orders (saluting sailor) and Summary (clipboard). Below these are six system buttons – Navigation (wheel icon), Main Guns (blue turret), Secondary Guns (green turret), Torpedoes (torpedo), Illumination (searchlight), and Division/Ship Status (blue ship).

Orders Button
Click on the Orders button to highlight it. You now have access to the orders panels for your current division. Click on a system button to bring up a panel where you can issue orders for that system (for example, Main Guns).

If a particular ship in the division has that appropriate system, its ship box is highlighted. Otherwise, it is not. For example, the ship box of a BB that carries no torpedoes does not highlight when you click on the Torpedoes button.

There is no orders panel for Division/Ship Status – this is a summary only button.

Summary Button
Click on the Summary (clipboard) button to highlight it. You now have access to the summary panels for your current division. Click on a system button to see the information about that system for the division's ships.

Division Summary Panels

Navigation Summary Panel
Speed: current speed of ship expressed in knots.

Current Max. Speed: how fast that ship can go.

Course: division's heading expressed in compass degrees.

Structure Damage: total damage to ship's hull, expressed as a percentage. At 100%, the ship goes Out of Action and may not operate any of its systems (it slows to a halt).

Flotation Damage: how much flooding the ship has taken, expressed as a percentage. Flotation damage lowers a ship's maximum speed. At 100% level, the ship is Sinking and cannot operate any of its systems.

Fire Level: how many fires the ship has on board. Fires can be very dangerous, especially as the number of them grows.

Status Summary Panel
Crew Quality: Green, Average, Veteran, or Elite. Crew quality affects weapons performance, sighting, and repairs.

Crew Fatigue: Fresh, Normal, Tired, or Fatigued. Crew fatigue affects weapons performance, sighting, and repairs.

Night Fighting: Poor, Average, Good, or Excellent. Night fighting skill affects visual sighting and weapons performance at night.

Radar: None, Poor, Average, or Good. Radar is useful for sighting, especially under reduced visibility conditions.

Turn Rate: turning diameter expressed in yards. An Emergency turn will cut this rate by 25%.

Acceleration Rate: how many knots per minute the ship can increase its speed.

Deceleration Rate: how many knots per minute the ship can reduce its speed.

Main Guns Summary Panel

Gun Type: number and type of main guns. See the *Gun Data Table* on page 123 for a complete list of gun types. All warships carry main guns.

Target #1: name of first target for the ship's main guns.

Hit Chance: the likelihood of hitting target #1, expressed as a percentage.

Target #2: name of second target for the ship's main guns.

Hit Chance: the likelihood of hitting target #2, expressed as a percentage.

Director #1: Active, Off-line, Damaged, or Destroyed. Each warship has two gun directors for fire control. The accuracy of the ship's guns is seriously reduced if one or, worse, both directors are not operating normally (Active). The ship's crew automatically attempts to repair a damaged director (or a damaged electrical system that has knocked the director off-line).

Director #2: see above.

AP/COM/HE (Ammo): remaining number of shells for that ship's main guns in those types. AP is Armor-Piercing (good against armored targets); COM is Common (used by guns under 5.9" caliber); HE is High-Explosive (good against unarmored targets).

Secondary Guns Summary Panel

Sec. Gun Type: number and type of secondary guns. See the *Gun Data Table* on page 126 for a complete list of gun types. Not all ships carry secondary guns.

Target #1: name of first target for the ship's secondary guns.

Hit Chance: the likelihood of hitting target #1, expressed as a percentage.

Target #2: name of second target for the ship's secondary guns.

Hit Chance: the likelihood of hitting target #2, expressed as a percentage.

AP/COM/HE (Ammo): remaining number of shells for that ship's secondary guns in those types. AP is Armor-Piercing (good against armored targets); COM is Common (used by guns under 5.9" caliber); HE is High-Explosive (good against unarmored targets).

Ter. Gun Type: number and type of tertiary guns. Some BBs and BCs carry tertiary guns in addition to secondary guns. You do not give orders to tertiary gun systems. Instead, they automatically engage any target within 5000 yards.

CCF: Close Combat Factor, expressed as a number. These are the smallest weapons carried by the ship (machine guns and small caliber cannon). They automatically engage any enemy ship that approaches within 3,000 yards and do slight structural damage based on their number. Some ships do not have a CCF.

Torpedoes Summary Panel

Torpedo Type: see the *Torpedo Data Table* on page 123 for a complete list. Not all ships carry torpedo mounts.

Mount #1: number of torpedoes on that mount ready to fire. If fired, the countdown in minutes and seconds until the torpedoes reach their estimated interception point with their target. If that time elapses without striking, the countdown in minutes and seconds until the torpedoes reach the end of their run time. A mount that has expended its torpedoes is empty.

Mount #2: see above.

Mount #3: see above.

Mount #4: see above.

Illumination Summary Panel

Starshell Target #1: name of first target if any.

Starshell Target #2: name of second target if any.

Searchlight Target #1: name of first target if any.

Searchlight Target #2: name of second target if any.

Searchlight Port #1 Status: Normal, Off-line, or Destroyed. Each warship has one or two searchlights on each side of the ship (port and starboard). A searchlight that is off-line will return to normal after the crew repairs the damage to the ship's electrical system.

Searchlight Port #2: see above.

Searchlight Stbd #1: see above.

Searchlight Stbd #2: see above.

Division Orders Panels

The Division Orders Panels allow you to coordinate the actions of a division's ships much as a commander on the scene would. You may set orders for the division's gunfire, illumination (night only), and navigation. Click on the Orders button of the Division Button Box, then click on one of the following buttons below it:

• Main Guns (blue turret) button to bring up the Division Main Guns Panel (or press Ⓜ).

• Secondary Guns (green turret) button to bring up the Division Secondary Guns Panel (or press Ⓢ).

• Illumination (searchlight) button to bring up the Division Illumination Panel (or press Ⓘ).

• Navigation (wheel) button to bring up the Division Navigation Panel (or press Ⓝ).

You may not launch torpedoes from the division level. You must select individual ships for torpedo launch (see *Single-Ship Torpedoes Panel* on page 42).

Division Main Guns Panel

High Explosive
Auto Select
Principle Target
Second Target
Detach Selector *chain*
Division Orders Button
Division Summary Button
Current Division
Armor Piercing
Common
Navigation Panel
Main Gun Panel
Illumination Panel
Secondary Gun Panel
Battle Line Mode
Range Mode
Threat Mode
Hold Fire
Ship Status Panel
Torpedo Panel
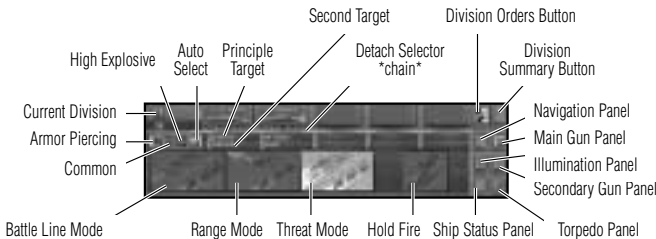
Select Targeting Mode

When issuing orders to the division's main gun batteries, you have four targeting modes. Click on the mode you desire for the division. For more information, see *Division Targeting Modes* on page 86.

Battleline Mode: Each ship in the division targets the closest enemy ship that is not engaged by some other ship in the division. Your ships will double up against an enemy target only if there are no other enemy targets available. In this way, the division spreads its fire over as many enemy ships as possible. Targets are re-evaluated each time you click on Battleline.

Range Mode: Each ship in the division fires at the enemy ship closest to it. The program re-evaluates the ships' targets every 10 seconds, but a ship will not switch fire until a new target is more than 10% closer than the current one.

Threat Mode: Each ship in the division fires at the target that poses the greatest threat to it. The program re-evaluates the ships' targets every 10 seconds. The target ship's type, range, and torpedo capability determines its threat level to the firing ship.

Hold Fire: The division does not fire until you select another targeting mode.

Select Ammunition

You have four choices for the division's ammunition selection. Click on the button to select that choice. If any ship in the division does not have that ammo type or runs out of it, the ship automatically starts to use whatever type remains for its guns.

AP: Armor-piercing. Most effective against armored targets. Available for guns of 5.9" bore size or larger.

Common: Only type of ammo available for guns below 5.9" bore size.

HE: High-explosive. Most effective against unarmored targets such as DDs and TRs. Available for guns of 5.9" bore size or larger.

Auto Select: (Captain's cap). The program automatically selects the most suitable type to fire at the given target.

Main Gun Target List

The principal target for each ship in the division is listed below the Ship Boxes. If any main gun turrets on a ship cannot fire at the principal target (due to restricted firing angle for instance), they will instead fire at the second target listed for that ship's main battery.

If the firing ship's guns are under local instead of divisional target control, the target list background is graphically different to show this.

Division Secondary Guns Panel

This panel (key press [S]) is identical to the Main Guns Panel, except it applies to the division's secondary armaments. Your secondary guns may fire at different targets than your main guns. However, a ship's tertiary guns automatically fire at any target within 5000 yards.

Division Illumination Panel

Principle Target
Second Target
Searchlights
Target Filters
Targeting Mode (searchlights)
Starshells
Targeting Mode (starshells)
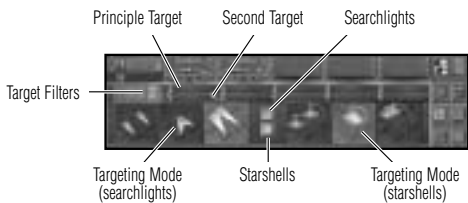
This panel (key press [I]) is available during night battles only, between sunset and sunrise. From this panel, you may turn on searchlights or fire starshells, choosing the targeting mode for each (the modes are the same as those used for guns).

Searchlights: Searchlights tend to give away your position to the enemy, but they are effective in illuminating targets for your guns within 5,000 yards. Highlight the Searchlight button to turn your division's searchlights on, then click on a targeting mode. These are the same modes as described for guns.

Starshells: Starshells are munitions fired by your ships' guns to light up an area of ocean around a target. The target must be 4,000 yards away or farther, so starshells are most useful for illuminating targets outside searchlight range. However, while searchlights stay trained on their targets (within 5,000 yards), targets beneath starshells can move away from the illuminated area. Furthermore, each ship firing starshells allocates one of its gun turrets to do this (choosing tertiary before secondary and secondary before main gun), so the ship's gunfire is lessened. Highlight the Starshell button to activate starshells, then click on a targeting mode.

Illumination Target List: The principal and secondary target for each ship's searchlights or starshells is listed below the division's Ship Boxes. Click on the appropriate filter button (Searchlight or Starshell) to display the target list for one or the other.

Navigation Panel

Ordered Heading • Choose Bearing Buttons • Execute Turn or Cancel • Turn Information • Smokescreen • Emergency Turn • Port Turn Button (red) • Starboard Turn Button (green) • Strategic Map • Selected Division • Recognition Lights • Column Turn Button • Current Heading • Line Turn Button • Current Speed • Ordered Speed • Maximum Speed • Change Speed • Evasive Maneuvers
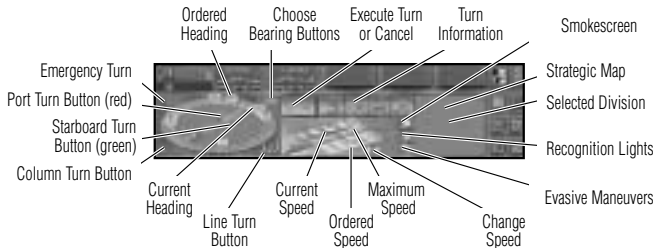
The Navigation Panel (key press $\boxed{N}$) allows you to issue speed and turning orders to your division or to modify an auto-plotted turn. You may also turn Smokescreens On/Off, turn Recognition Lights On/Off, or order the division to use Evasive Maneuvers.

How to Change Speed

The speed of a division is measured in knots. The Speed Window displays three speed markers for the selected division:

Maximum Speed: Highlighted with red border. The division's maximum speed is linked directly to the maximum speed of the slowest ship in the division.

Current Speed: Highlighted with blue border.

Ordered Speed: Highlighted with green border. You may set the ordered speed anywhere from 0 to 40 knots (however, the division will never exceed its maximum speed). There are two ways to change a division's speed: click at a desired point on the gold speed bar, or click on the down/up speed scroll buttons to change speed by 1-knot increments. Speed changes do not occur immediately. The division accelerates or decelerates gradually until the current speed matches the ordered speed or the maximum speed, whichever is less.

How to Order a Turn

You may use the Auto-Plot feature on the 2D map to order a turn for the selected division. In either view (2D or 3D), you may issue turning orders or modify an auto-plotted turning order using the Navigation Panel.

On the left-hand side of the panel, a compass ring is displayed that surrounds a ship icon representing the lead ship of the selected division. The division's current ordered course is highlighted on the ring and may be anything from 0 to 359 degrees. The cardinal directions are marked by 0 (north), 90 (east), 180 (south), and 270 (west).

When making a course change, there are four decision points. You can make these decisions in any order and go back to change a previous decision. You can even switch panels or divisions and come back to the turn order later. As you enter a turning order, it is shown on the compass window, on the 2D/3D display, and repeated in the boxes to the right of the Cancel button. However, once you click on Execute Turn, the order is locked in and you cannot change or stop it.

- Turn to port (left) or starboard (right).

- Choose a new bearing (0 to 359 degrees).

- Turn in column (every ship follows the leader's path) or in line of bearing (every ship turns at the same instant).

- Make a normal turn or an Emergency Turn (the ships turn in a tighter diameter than normal but risk a jammed rudder).

Port/Starboard Turn: The default turn arrow inside the compass is starboard (green). To select a port turn (red), click on the left arrow inside the compass to highlight it instead.

Choose Bearing: Click on any point of the compass ring to set the new bearing. You may also click on the Turn Scroll buttons to adjust the new bearing by 1-degree increments. Your ordered heading appears on the compass ring and on the 2D and 3D view screens. In 3D view, arrows appear on the sea surface to indicate the curving path of the turn.

Column or Line Turn: (Does not apply to single-ship divisions or convoy formations, which always turn simultaneously.) Click on the Column Turn button if you want all ships in the division to follow directly in the wake of the lead ship. Click on the Line Turn button if you want all ships in the division to turn at the same time, which results in a line-of-bearing formation instead of a column formation. When the selected division is in line of bearing, the Column Turn button becomes a Reform Column button. Click on this button to order a new course that will return the ships to column formation. The division can reform column in one of two directions, which are 180-degree opposites.

Emergency Turn: In an emergency situation you may want your ships to turn on a tighter diameter than normal. Highlight the Emergency Turn button to order this. The division then makes its turn on a diameter that is 75% of normal. For example, if the division's turning diameter is 600 yards, it will turn on a 450-yard diameter instead. However, there is a 1% chance for each ship in the division that it will jam its steering in that direction until its damage control parties can repair it. A ship with jammed steering will very likely fall out of formation.

Execute Turn or Cancel

When you are satisfied with the turning orders you have entered, click on the Execute Turn button to begin the turn, or click on the Cancel button to erase the orders. If you click on Execute Turn, a padlock icon appears, indicating that you cannot change the order or enter a new one for that division until the lead ship has finished its turn. (If turning in column, you cannot issue a line turn order until all ships have finished the column turn.) A Turning icon also appears next to the Division Flag on the Division and Ship Panel while the turn is in progress.

Smokescreen Toggle

Highlight the Smokescreen toggle to turn smokescreens on. A pop-up appears, from which you select the ships in the division you want to generate smoke. The selected ships lay smoke until you turn it off. Smokescreens interfere with visibility, so they are useful for creating cover that other ships (such as transports) can hide behind. Smoke drifts with the wind and dissipates over time. The higher the wind speed, the sooner the smoke dissipates. The Environment Panel on the Briefing screen lists the direction the wind is blowing from and its speed.

Recognition Lights Toggle

Highlight the Recognition Lights toggle to turn recognition lights on at night. A pop-up appears, from which you select the ships in the division you want to turn on lights. Recognition lights are only useful in Division Commander mode when unidentified ships might be friendly or enemy. When your lights are on, you are displaying your ship's nationality to outside observers. The lights also make your ship more visible, so you should not leave them on for long periods.

Evasive Maneuvers Toggle

Highlight the Evasive Maneuvers toggle to use evasive maneuvers when you are fearful of enemy gunfire. The ship view window does not show your ships' evasive paths, but your division is effectively steaming an erratic course to throw off enemy fire control. Evasive maneuvers negatively affects the chance of enemy shells hitting your ships, but it also reduces the accuracy of your own ships' gunfire, and it slows your division's forward progress through the water (not its speed setting) by 20%. An Evasive Maneuvers icon appears by the Division Flag on the Division and Ship Panel when you have this tactic enabled.

Strategic Map

A strategic map appears on the right-hand side of the Navigation Panel. The map displays a 2D view centered on the selected division. This map is for information only.

Single-Ship Panels

To give orders to an individual ship within a division, highlight the Main Guns, Secondary Guns, Illumination, Torpedoes, or Status button on the Division Button Bar, then click on the Ship Box of the ship you want to give those orders to. You may not issue navigation orders at the single-ship level – all navigation occurs at division level.

Once you have a single-ship panel open, you can select another ship in the division by clicking on its Ship Box or by pressing the 1 - 0 keys for 1st-10th ship in the division (going from left to right on the Ship Box display). You can switch divisions in the single-ship panel by clicking on a division number in the list display beneath the flag on the Division and Ship Selection Bar.

To return to division panels, click on the Divisions Orders or Division Summary button.

Single-Ship Torpedoes Panel

Torpedo Range/Speed

Spread Width   Mounts   Chance to Hit

Target

Fire Button
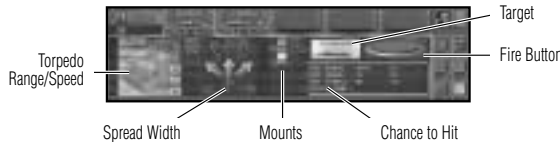
You may only issue torpedo launch orders at the single-ship level. To access the panel for the currently selected ship by hot key, press T. There are three decisions to make before you fire a ship's torpedoes: choose target, choose spread width, and choose mounts to fire. You must choose the target before you can choose the mounts to fire.

Target: A target pop-up window appears when you click on the Target List Box, which includes all targets, even those outside your maximum torpedo range. Select one target from the list. Displayed below the Target List Box are percentage factors that estimate the chance to hit, thus providing an idea of how good a shot you are taking. These include target aspect, target speed, and target range. The ideal target has a broad aspect, slow speed, and short range. However, these chance-to-hit factors assume that the target maintains its current heading and speed.

Player's Ships

Enemy Ships

Targets

Torpedo Range/Speed: Depending on its type, a torpedo has one to three range/speed settings. The program automatically chooses the range/speed setting that will reach the estimated interception point with the target, which assumes the target maintains its course and speed. You may not change the range/speed setting. Torpedoes are harmless during the first 1,000 yards of their run and after they reach the end of their run.

Spread Width: Choose one of three settings. The narrow width increases the chances of hitting, assuming the target remains on its current course at its current speed. A wide spread covers more sea but reduces the chances of hits.

Mounts: Only centerline mounts or mounts on the side you are firing to may be used. Mounts that cannot be used are blocked out. All torpedoes in a given mount are fired at the same time. There are no torpedo reloads during battle. Select (highlight) a mount to fire it. You may fire multiple mounts in the same spread. After a mount has fired, the number of seconds remaining until its torpedoes reach their calculated interception point appears by the icon. If this time elapses, the number displayed represents the time remaining before the torpedoes reach the end of their run.

Fire: After you have selected mounts to fire, a Fire Button appears on the panel. A blue cone also appears on the 3D view and 2D map, showing the diverging torpedo spread out to the end of its run. When you are satisfied with the decisions you have made, click on the Fire button to launch the torpedoes (the cone then disappears on the 3D view and a spread bar appears in the water indicating the location of the torpedoes). You may leave the Torpedo Panel without firing torpedoes. If you return to the panel, as long as you previously selected a target, the target remains selected (and a spread cone is displayed if at least one mount can fire) until you hit Fire or change the target.

Single-Ship Main Guns Panel

Instead of issuing firing orders for main guns at the division level, you may issue them at the single-ship level. Bring up the Single-Ship Main Guns Panel for the selected ship. You may choose up to two targets for your ship's main guns. If you want to return the ship's main guns to division control, highlight the Division Control button. The Single-Ship Main Guns Panel also displays the factors that affect your main guns' chance to hit, and the armor thickness that its shells can penetrate at the current range to the selected target.

Target List Window

Click on the Target List Box to open a window that lists all possible targets for your ship's main guns. Select one target from the list. Any turrets whose arcs can bear on that target switch fire to that target. (To deselect turrets, you must first highlight the Turrets Selection button – see below.) If you select a second target from the second Target List Box, any turrets not firing on the first target attempt to fire at the second. However, you should keep in mind that splitting your main guns between two targets is often less efficient (in terms of chance to hit) than aiming them all at a single target.

Ammo Selection Buttons

Highlight the button of the ammo type you want to fire at that target: AP (Armor-Piercing), Common, HE (High Explosive), or Auto-Select (the program selects the type best suited against that target). Guns below 5.9" bore size only fire Common. Guns of 5.9" bore or greater fire AP or HE. If your ship runs out of one ammo type, it will automatically select the other (in other words, the ship does not stop firing when the selected type is depleted).

Turret Allocation Diagram

Click on the Turret Allocation button to display a diagram of the ship's turret layout. Turrets indicated with a 1 are firing at the first target. Turrets indicated with a 2 are firing at the second target. An X shows a destroyed turret, and a star shows a turret that is committed to firing starshells. You can select which turrets fire at a given target and which turrets hold their fire. The currently selected target list box is highlighted. Click on a turret to toggle between off and the target's number (1 if the top target list box is selected, 2 if the bottom target list box is selected). The default value is zero which is hold fire.

Gunnery Modifiers Display

Click on the Gunnery Modifiers Display button to bring up a bar graph showing the effects of different modifiers to your gunfire against the selected target. Positive modifiers appear as bars raised above the 0 line; negative modifiers appear as bars below the 0 line. For full information about *Gunnery Modifiers,* see page 88.

Gunnery Data Display

Click on the Gunnery Data Display button for information on the main guns chance to hit and penetrate the target's armor. This shows the percentage chance of the shells striking as direct or plunging fire. It also lists the armor thickness (in inches) that the shells can pen

etrate at the current range for direct and plunging fire. The base hit percentage is shown, and the final hit percentage (after all modifiers are applied). The current (adjusted actual) reload time and base reload time for the guns are indicated. If the target information is at Name level, the target's armor values (as shown on the Ship Viewer) are also displayed.

Single-Ship Secondary Guns Panel

This panel works identically to the Single-Ship Main Guns Panel but for secondary guns. However, some smaller warships do not carry secondary guns.

Single-Ship Illumination Panel

Instead of issuing illumination orders at the division level, you may issue them at the single-ship level. Bring up the Illumination Panel for the selected ship. You may choose up to two targets each for your ship's starshells and searchlights. If you want to return the ship's illumination orders to division control, highlight the Division Control button.

Starshells: Highlight the Starshell button to order starshells, then click on one of the Target List Boxes. A pop-up window appears, listing all possible targets for your starshells. Select one. To assign a second target, go to the second Target List Box. A turret is automatically assigned to fire starshells at each target you select.

Searchlights: Highlight the Searchlight button to activate searchlights, then click on one of the Target List Boxes. Select one. To assign a second target, go to the other Target List Box.

Single-Ship Status/Damage Panel

The Status/Damage Panel for single ships provides information only – you do not issue orders or change settings on this panel. The percent of structure damage is indicated on the structure boxes. Each structure box represents 2% of the ship's structure system. The percent of flooding damage is indicated on the flotation boxes. Each flotation box represents 5% of the ship's flotation system. Fire levels are indicated by 0-10 fire icons (10 is the worst fire level). The Status/Damage Panel also provides damage information about the ship's weapons and other systems. To get a detailed display about a particular system, click on the Main Guns, Secondary Guns, Torpedo Mounts, or Ship Systems button. A pop-up appears by the button you click on.

Main Guns Status/Damage Display

(Blue turret icon.) This display shows each of the ship's main gun turrets and its two main gun magazines. A turret or magazine is either operable or destroyed. Icons show the number of barrels in a given turret (1-4). Each turret icon points in the direction of its main arc of fire, with the bow of the ship to the left and the stern to the right.

Secondary Guns Status/Damage Display

(Green turret icon.) This display shows one turret each for Fore, Aft, Port, and Starboard secondary guns with a corresponding number representing the remaining secondary gun turrets. Secondary gun magazines are not displayed (they cannot be destroyed). If the ship carries no secondary gun armament, the button may not be selected.

Torpedo Mounts Status/Damage Display

(Torpedo icon.) Each warship carries 0-4 torpedo mounts. As with gun turrets, a torpedo mount is either operable or destroyed. A mount cannot reload during battle, so once fired it is empty. If the ship carries no torpedo mounts, the button may not be selected.

Division Number — Main Guns — Secondary Guns — Torpedo Mounts — Ship Systems — Damage Control — Maneuver — Power — Propulsion — Bridge — Fire Detectors — Searchlights — Radar — Structure Damage (hull boxes) — Fire(s) — Flotation Damage
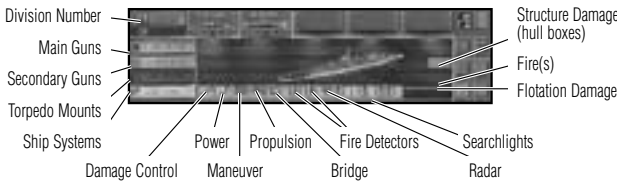
Systems Status/Damage Display

(Blue ship icon.) This displays the other systems not covered under the weapons buttons. Systems can be operable, damaged, or destroyed. If a system is damaged, the repair time remaining (in minutes and seconds) appears by its icon. For more information, see *Damage to Ship Systems* on page 95.

- Damage Control (repairs damaged systems, and puts out fires)
- Power (electrical system – Weapons, Searchlights, Radar, and Bridge systems go off-line when the power system is damaged)
- Maneuver (rudder and steering, which affects the ship's turning ability)
- Propulsion (engines, which affects the ship's speed)
- Bridge (can be damaged but not destroyed)
- Fire Directors (two per ship – affects fire control of the main guns)
- Radar (not all ships have radar)
- Searchlights (port and starboard – BBs and BCs have two searchlights on each side)

Function Bar

2D/3D View — Camera Control Panel — All Ships Display — In Game Victory Screen — Game Speed and Pause Settings — End Battle — Full Screen/Half Screen Toggle — Preferences Screen — Briefing Screen/Environment Panel — Ship Viewer Screen — Save Game Screen — Exit Game
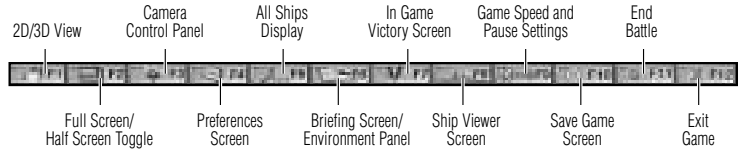
When you move your mouse cursor off the top of the 3D or 2D screens, the Function Bar appears. The Function Bar gives you access a variety of options. Click on a tab you want, or press the equivalent key on the keyboard.

F1 - 2D/3D Option

This tab toggles the game between the 2D and 3D screens. The 2D view has a Map Control Panel to the right of the screen and interface panels at the bottom of the

screen. The 3D view has the same interface panels, with a side panel of Camera Controls. The Camera Controls panel defaults to being on screen at the beginning of any battle, but may be turned off – see F3 below.

F2 – Full Screen/Half Screen Option

When you click on this tab, the game displays the 3D view in the entire screen (with Camera Control Panel to the right). Pressing F2 when the full screen is up takes you back to the normal, half-screen, 3D view with the bottom Division and Ship Panels visible.

F3 – Camera Control Panel

This tab toggles the Camera Control Panel on or off (the panel appears at the right side of the 3D map). If you are in 2D mode, choosing this tab (or pressing F3) takes you to 3D mode.

F4 – Preferences Screen

Click on this tab (or press F4) to bring up a full-screen display that allows you to see which options you selected and turned on or off at the start of the game. You may change any of your selections except Realism during the game. See *Preference Settings* on page 49 for full details.

F5 – All Ships Display

User's Nationality — Structure Damage — Fire(s) — Enemy Nationality — Main Guns — Secondary Guns — Flotation Damage — Type — Ship Name — Current Speed/Maximum Speed
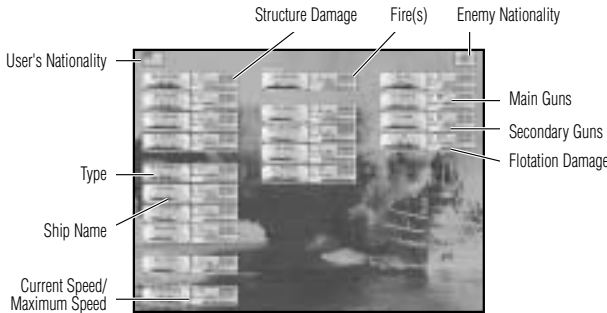
Clicking on this tab or pressing F5 takes you to a full-screen All Ships display of information. The All Ships display provides you with current known information about all the ships in the scenario that you are playing. Any mouse click or key press returns you to your previous place in the game.

The All Ships screen displays the same information found on the secondary ID tags, including current state of damage. A numbered pennant flag indicates a flagship. Friendly ships appear on the left side of the screen and enemy on the right (the middle column is filled last in both cases). Friendly ships are arranged according to division except in Division Commander mode when your division appears at the top of your side's list. Enemy ships are arranged in the order they were discovered. However, ships on either side that are out of action or sunk appear at the end of their side's list.

F6 – Briefing Screen

The `F6` key or tab brings up the Briefing screen, which provides you with information about your side's ships and the scenario you are playing. You cannot make changes or alterations to your force on this screen. This screen is never updated as ships are lost or detached – it only shows the information from the start of the scenario. Environment details appear as a pop-up window at the top of the screen when you click on the Environment button. Click the Continue button to return to the game.

Environment Panel

Sunrise, Sunset, and Start times for the scenario are given in military time (24-hour clock).

The direction the wind is blowing from is given as a compass bearing, and its speed is expressed in knots.

Sea State is rated according to the Beaufort scale. Level 1 is calm. Level 8 is the highest in the game.

Radar and Visibility are displayed as percentages of their standard values. Radar may be less than 100% due to Ground Clutter (see page 81 for an explanation of *Ground Clutter*). Visibility may be less than 100% due to fog, mist, etc. Visibility at night is 11-40%, and visibility during the day is 41-100%.

The Initial Visual Detection Range table displays the initial visual sighting ranges, which are 90% of the standard ranges for the current visibility conditions. These values are expressed in yards for individual ship types. Cross-index the observing ship type with the target type to find the range that the target is first observed. For further information, see *Visibility System* on page 80.

F7 – In-Game Victory Screen

Clicking on this tab or pressing `F7` displays the In-Game Victory Screen. You can see a current update of your VP score vs. the enemy's. However, information may be inaccurate or limited, depending on your Preference settings. Mission Points reflect how well your side has accomplished its goal and may start as a negative total. Damage Points reflect VPs of damage your side has inflicted on the enemy. The VP Modifier is fixed at the start of the scenario. Click on the Back button to return to the game. See *Winning the Game* on page 62 for more information about victory.

F8 – Ship Viewer Screen

Click on this tab (or press the `F8` key) to go to the Ship Viewer screen to see the game's ships in 2D or 3D view, plus detailed ship data and special effects. See page 53 for a full explanation of the *Ship Viewer*.

F9 – Game Speed and Pause Settings

The F9 tab allows you to pause the game or change the game speed. Speed selections for the game are Pause, Normal, Fast, Faster, and Turbo. When visibility is poor, or the enemy is at short range, you may want to use the Slow setting to give you more playing time to react to a fast-changing situation.

You may also press the `P` key to Pause or Unpause the game. When paused, you may issue orders to your ships in single-player games (not in multiplayer games), and the orders will be executed after unpausing.

F10 – Save Game Screen

Clicking on this tab or pressing `F10` takes you to the Save Game screen. The program knows if you are saving a Campaign or Scenario game and displays the appropriate list. The national flags of the forces involved appear to the right of each saved game. There is no limit to the number of games you can save as long as you have disc space.

Type in a name for the game you want to save, or highlight an existing saved game or the Auto Save button, then click on the Save button. The file is saved and the program returns you to the game in progress (if you decide not to save, click on the Cancel button to return to the game). If you are overwriting an existing saved game file, a prompt appears allowing you to proceed or cancel.

F11 – End Battle

To quit the current battle, click on this tab and then choose Surrender or Accelerate End. After ending a battle, the End Game Victory screen appears, allowing you to review the battle in Replay (see page 64) or return to the Main Menu.

Surrender: If you surrender, you have admitted defeat and the battle immediately ends (even in a multiplayer game). All of the ships on your side are considered sunk, and surviving enemy ships score Mission Points as if they had completed their mission (for example, ships with a bombarding mission would bombard, assuming they had sufficient ammunition to do so – see *Battle Types and Missions* on page 73).

Accelerate End: If you Accelerate End, the program's AI takes control of your ships and attempts to disengage them. In Division Commander mode, it only tries to disengage your division; other divisions the AI controls continue the battle under normal AI direction. However, the process runs as quickly as possible and the screen is not updated. In this way, a game hour can be processed in a few seconds. Once triggered, this process cannot be undone. You cannot Accelerate End in a multiplayer game.

F12 – Exit Fighting Steel

Click on this tab (or press `F12`) to exit the game. A prompt appears asking you to confirm. Confirming returns you to your desktop.

Event Messages

Text messages about current game events appear on the screen. Some key events are described by voice messages. All of these messages are self-explanatory. Some messages announce Minor, Major, or Critical damage to a friendly ship's system. Critical is the most severe.

Light Flooding or Light Hull Damage messages appear for a friendly ship when its damage level in the appropriate category is greater than 25%. Medium Flooding and Medium Hull Damage messages indicate greater than 50% damage, and Heavy Flooding and Heavy Hull Damage indicate greater than 75% damage.

■ PREFERENCE SETTINGS

You may change the game's preference settings for audio, camera, realism, 3D, and auto-saves before loading a battle. Click on the Telegraph button in the Player Options screen (single-player) or Host Create screen (multiplayer) to access the Preference Settings screen. During game play, press the F10 key to access Preference Settings, but you may not change Realism settings after the battle has loaded.

The Preference Settings screen is tabbed to show five different sub-screens that can be opened one at a time by clicking on the tab: Game, Camera, Realism, Audio, and Random Battles. Most items in the sub-screens are toggle items – click on an item to switch it. Grayed-out items are not available.

Game Settings

The game settings are toggled ON or OFF individually. Toggling 3D options ON can adversely affect the speed that the game runs on your machine.

3D Options

• *Ocean Texture On/Off:* When OFF, the ocean is one color.

• *Sky Texture On/Off:* Adds clouds to sky when ON.

• *Smokestacks On/Off:* Smokestacks belch smoke when ON.

• *Sea Swells On/Off:* Ocean surface has a wavy texture when ON.

• *Rolling Ships On/Off:* Ships lean when making turns, recoil when firing main guns, and roll up and down in the water.

Text Options

• *Message Text On/Off:* Default ON. If OFF, the text messages writing over the 2D and 3D screens do not appear.

Auto Save On/Off: Not available during multiplayer games. Select the minute interval between auto saves by clicking on the desired time.

Camera Settings

Automatic ID Tags On/Off: Default ON. When the camera focuses on an auto-camera event, the ID tag of the ship in focus is displayed even if the ID tags are not turned on in the Camera Buttons Panel. In certain camera views, this mode also comes into effect:

Look-Thru, Target Track, and Enemy-Track will all turn on the ID tags of the target ship if they are not already turned on in the Camera Buttons Panel. The ID tags only appear while the camera focuses on the target, and disappear when the camera moves away.

Reset Gamespeed On/Off: Default ON. Program resets the gamespeed back to the speed being used prior to showing an auto-camera event (all auto-camera events are shown at normal game speed). When OFF, the game remains at normal game speed after any auto-camera event.

Navigation Plot Camera On/Off: Default ON. Overrides your current camera mode to track your navigation order entry. When finished, the camera view returns to its previous settings. This mode is always an immediate camera transition. In Manual camera mode, this option is disabled.

Torpedo Plot Camera On/Off: Default ON. Overrides your current camera mode to track your torpedo attack order entry. If you fire torpedoes, the camera moves to view the firing sequence, pans to the firing direction, and then exits this mode to return to its previous settings. This mode is always an immediate camera transition. In Manual camera mode, this option is disabled.

Camera Transitions – Immediate/Fluid/Automatic: Default Automatic. You can toggle through three options to decide how the camera will move from one location to another. You can only select one of these options at one time. Fluid transitions move the camera to its new position in a series of incremental steps. Immediate transitions move the camera immediately to its new position with no intermediate steps. Automatic transitions combine the actions of both Fluid and Immediate, using Fluid whenever moving the camera less than 4,000 yards and Intermediate whenever moving over 4,000 yards.

Forced Auto Camera On/Off: Default ON. When switched ON, the game view automatically switches to the 3D display whenever an auto-camera event is being shown. At the conclusion of the event, the game view switches back to the 2D screen if the player had been in 2D mode. While an auto-camera event is being displayed in 3D, you may override it and return immediately to the 2D screen by pressing the F1 key.

Auto-Camera Events: Click on this button to open a window that lists the events. The auto camera will show all events that are checked. Toggle an event off if you do not want the camera to show you that particular event. If the scenario contains many ships, it is wise to toggle some of these events off so that the auto camera does not interrupt your play too frequently.

• *Enemy Sinking:* Displays the interesting part of an enemy ship sinking or blowing apart.

• *Enemy Hit by Torpedoes:* Displays an enemy ship when it is hit by a torpedo.

• *Enemy Turret Explosion:* Displays an enemy ship when its turret is destroyed in a graphic way.

• *Enemy on Fire:* Displays an enemy ship at the moment the fires on board it grow sufficiently to be displayed graphically in the 3D world.

• *Enemy Hit by Shell:* Displays an enemy ship when it is hit by shellfire.

- *Enemy Fires First Time:* Shows an enemy ship firing its main guns at a ship in your division when your ship is a new target for that enemy's guns.

- *Enemy Illuminated:* Shows an enemy ship when it becomes illuminated by a starshell.

- *Shell Cam:* Shows one of your ships firing its main guns, and the camera follows the shells to the target if the salvo straddles the target (whether any shell actually hits or not).

- *Playership Sinking:* Displays the interesting part of a friendly ship sinking or blowing apart.

- *Playership Hit by Torpedo:* Displays a friendly ship when it is hit by a torpedo.

- *Playership Turret Explosion:* Displays a friendly ship when its turret is destroyed in a graphic way.

- *Playership on Fire:* Displays a friendly ship at the moment the fires on board it grow sufficiently to be displayed graphically in the 3D world.

- *Playership Hit by Shell:* Displays a friendly ship when it is hit by shellfire.

- *Playership Fires First Time:* Shows one of your ships firing its main guns when it opens fire on a new target.

- *Playership Illuminated:* Shows a friendly ship when it becomes illuminated by a starshell.

- *New Contact:* Displays an enemy ship when it is first sighted as a Contact.

Realism Settings

The realism settings are displayed in nine rows of two options each. For each realism setting, only one option can be toggled on (highlighted) at any given time.

At the bottom of the screen are four buttons labeled Custom, Beginner, Intermediate, and Advanced. If you click on Beginner, all settings on the right column are selected (the least realistic). Clicking on Advanced highlights all options on the left column (most realistic). The default setting is Intermediate, which uses some settings from both columns. Custom allows you to change the settings to what you desire.

Realism settings may not be changed once play has begun, but you may review the settings.

Visibility Realism

Restricted – Select restricted visibility to play the game with the normal visibility system.

Unlimited – With unlimited visibility selected, all enemy ships (and friendly ships in Division Commander mode) are considered visually sighted by all friendly ships at all times at the maximum level of contact information. Visibility modifiers for gunnery are not used.

3D Camera Realism

Restricted – Limits the camera modes that you may use and puts limits on the auto cam. The auto cam will not show all events. Also, Manual camera is not available, and

both Semi-Free and Top-Down modes are restricted in that you cannot move the camera more than 2,500 yards away from a ship in the current division.

Unrestricted – You may use all camera modes (views) and the auto cam shows all events by priority.

Ammunition Realism

Restricted – You are limited to each ship's shell supplies and can run out of ammunition.

Unlimited – Ships never use up their gun ammunition.

Enemy Damage Info Realism

Restricted – You only get approximate information regarding structure damage, flooding damage, fire damage, and gun turrets remaining in action on enemy ships.

Full – The displays give you accurate information about damage to enemy ships.

Victory Points Info Realism

Restricted – You do not get all VP information displayed during the game, getting the full VP information only after the battle.

Full – You know the full and exact VP score throughout the game (see *Winning the Game* on page 62 for further details).

Mistaken Maneuvers Realism

Mistaken Maneuvers Possible – When a turn is executed, there is a small chance for each ship (except the flagship) that it may make a different turn and drop out of the division.

No Mistaken Maneuvers – Ships never make a mistake when ordered to turn. However, ships with steering damage that cannot perform a given turn automatically detach from the division when the turn is executed.

Course Changes Realism

Limited Pre-Contact Course Changes – If you select this option, you cannot change course until an enemy ship is sighted, visually, or by radar, (the "enemy" could be an unidentified ship on the same side in Division Commander mode).

Unlimited Course Changes – This option imposes no restrictions on changing course.

Dud Torpedoes Realism

Dud Torpedoes Possible – Torpedoes have a 20% chance of failing to explode (percentage chance differs by nation if National Characteristics preference is active).

No Dud Torpedoes – All torpedoes run straight and true and never dud on impact.

National Characteristics

National Characteristics Active – Each navy has some slight differences in Damage Control or gunnery. If the Dud Torpedoes Possible setting is also chosen, then each navy has different torpedo dud rates. See page 73 for full details on *National Characteristics*.

No National Characteristics – All navies use the same modifiers.

Audio Settings

You may adjust the volume controls for Sound Effects, Voice, and Music by click-and-dragging the setting indicator, or you may mute any of the audio features by clicking the On/Off button. Each player may adjust the audio settings at any time in the game.

Battle Generator Settings

If you are playing a scenario created by the Battle Generator, you may view (but not change) the settings used to create that battle by clicking on the Battle Generator tab. See *Battle Generator* on page 65 for more details about the settings.

■ SHIP VIEWER

You can access the Ship Viewer screen during play by pressing the F8 key or clicking on the F8 tab of the Functions Bar. It is also possible to bring up the viewer by clicking on a ship in the Campaign Game Fleet Management screen.

The Ship Viewer is organized by ship classes. A class of ships consists of one or more ships that are built according to the same design and launched around the same time (give or take a year). Such ships are called *sister ships*. The Ship Viewer provides information about and 2D and 3D images of the nearly one hundred ship classes in the game. You view the classes one at a time.

To return to the game, click on the X icon at the top right of the Ship Viewer screen.

View Window

The View Window shows an image of the selected ship class. Controls at the bottom of the window allow you to change your view and choose the nation(s) whose ship classes you wish to view.

VP Value: each ship in the class has a Victory Point value, which is indicated at the top left of the screen.

Naval Flag: represents the navy that ship class belonged to.

Ship Type: based on contemporary USN two-letter designations. BB (battleship), BC (battlecruiser), CA (heavy cruiser), CL (light cruiser), DD (destroyer), TR (transport).

Class Name: often the name of the first ship built in that class.

How to Select Class

Four naval flag buttons appear below the view window. Click on any or all of them to highlight and select that navy (or press the F3 through F7 keys). You may not view the classes belonging to a particular navy unless you have that navy's button highlighted. You may then page through the ship classes using the U / Y keys.

U: next ship class in list. Classes are arranged from largest warship type (BB) to smallest (DD), with transports (TR) at the end of the list. If you have more than one naval flag highlighted, the next nation's ship classes start after you've paged through the previous nation's.

Y: previous ship class in list.

For fastest paging, select the 2D instead of 3D view. You can then change to 3D view after finding the class you want.

Viewer Controls

Click on the 2D or 3D button to highlight and select that view, or press the F1 key for 2D view or the F2 key for 3D view. You are limited to one view at a time.

2D View: provides a static side view of the ship. This view also provides the dimensions for the ship's length, beam (width), and draft (depth below waterline) expressed in feet. The 2D image cannot be altered in the Viewer.

3D View: provides a 3D view of the ship, which also allows you to change the view between day and night, alter the camouflage schemes, and change the camera position.

Sun: when highlighted, the 3D view shows the ship in daylight conditions. You can also see this view by pressing F7.

Moon: highlight this button to change the 3D view to nighttime conditions, which also allows you to turn on the ship's lights. You can also see this view by pressing F8.

Lights: highlight this button to see the ship with its recognition lights and searchlights turned on (if nighttime view selected).

Camouflage: click on this button to view the ship in a different camo scheme. There are nine different schemes. Repeated clicking will take you through the entire list, or press the 1 - 9 keys to make your selection.

+/-: click on these icons (or press the respective keys) to zoom out/zoom in.

Camera Angle: click on the up/down/left/right arrow icons to change the camera angle. You may also press the arrow keys on the keyboard for the same effect.

Weapon Data Display

The panels below the view window provide data about the ship class' guns and torpedoes.

Main Guns: number and type (rated by bore size in inches and caliber of tube length). Number of AP, Common, and HE shells carried.

Secondary Guns: number and type (rated by bore size in inches and caliber of tube length). Number of AP, Common, and HE shells carried.

Tertiary Guns: number and type (rated by bore size in inches and caliber of tube length).

CCF: Close Combat Factor, which is a number representing the ship's close-in weapons systems (typically, guns below 4" bore size).

Mounts: number of torpedo mounts on ship, which ranges from 0 to 4.

Tubes: number of torpedo tubes on each mount, which ranges from 2 to 5.

Type of Fixture: if centerline, the mounts can fire to either side of the ship. Otherwise, the mounts can only fire to one side or the other.

Torpedo Type: diameter of torpedo in inches and model designation.

Other Ship Data

Speed: ship's maximum potential speed.

Crew: number of men on board.

Tonnage: ship's full-load displacement in tons.

Armor: maximum armor thickness (in inches) for:

M*ain Gun Turrets*	*Secondary Turrets*
Armor Deck	*Armor Belt*
Superstructure	*Conning Tower*

Radar: quality of ship's radar for given dates (half-year periods ranging from late 1939 to late 1942). The more green showing on the bar, the better the radar quality: none, poor, average, good.

Hit Points: how much structural damage the ship's hit point system can take before the ship goes out of action.

Flotation Points: how much flooding damage the ship's flotation point system can take before the ship begins to sink.

Ship List: lists the names of all the ships in that class and the dates they entered service. Click on the scroll icons to move through the list.

■ CAMPAIGN GAME

The campaign game in FIGHTING STEEL is more than just a series of linked pre-written scenarios — it is an exercise in fleet management that is far more challenging because each battle is generated randomly. FIGHTING STEEL creates scenarios based on specific mission profiles for each nationality, and you respond with the forces at your disposal. In between battles you must manage your ships and crews to keep your forces in fighting trim — too much time in port can degrade crew ability, while too much time at sea causes dangerous levels of fatigue.

There are two different types of campaign game, the historical campaign and the fantasy campaign. Historical campaigns feature battles between the navies of two historical opponents, the US (USN) vs. the Japanese (IJN) in the South Pacific, or the Royal Navy (RN) vs. the Kreigsmarine (KM) in the North Atlantic. A fantasy campaign can pit historical opponents in unusual places, for example, the USN vs. the RN in the South Pacific.

Playing a campaign game consists of three steps: setup, fleet management, and combat.

Campaign Setup Screen

Campaign Type

This is the first choice you should make. The Campaign Setup screen provides you with several different settings depending on what type of campaign you wish to play, a Historical Campaign or a Fantasy Campaign.

Random Factor

This setting adjusts how much of a random factor is applied when the computer determines a type of mission for each battle during every campaign.

When set to 0, there is no deviation from historical percentages of mission type. In other words, RN missions have the greatest probability of being convoy missions or meeting engagements, while the IJN missions have a greater emphasis on bombardment missions. At the highest level of Random Factor setting, missions are not weighted historically at all, so any type of mission can be assigned at any time.

The Random Factor setting is changed by left-clicking on the button — each click increases the degree of change until the maximum is reached, when the setting resets to 0.

Location

The location selection is only available when playing a fantasy campaign, since historical campaigns take place in historical locations. The main effect of selecting a particular location is to alter weather conditions which in turn affects lighting and visibility during any given battle generated during the campaign.

Difficulty

Difficulty levels can be set to one of four different settings represented by the number of stripes on the "sleeve." Left-clicking on the "one-stripe" button selects the Ensign level of play, left-clicking on the "four-stripe button selects the Admiral level of play. These difficulty levels affect several factors of a campaign game. Selecting the Lieutenant level sets the variables for the conflict at historical levels.

The higher the difficulty level selected, the more battles you are likely to have to fight.

The difficulty level also adjusts size of any particular engagement, in terms of the number of ships appearing for both sides, based on values for each nationality — Royal Navy and Kriegsmarine missions tend towards smaller engagements, while US Navy and IJN engagements tend to be larger.

Mission Sizes

Small	. . . . 2-6 ships
Medium	. . . . . . 7-12 ships
Large	. . . . 13-20 ships

In a fantasy campaign, a setting called Battle Size is compared to the Difficulty setting to create the probability for any particular sized mission. A high Battle Size setting and a high Difficulty setting is the most likely to generate a large battle.

Increasing the difficulty level also increases the toughness of the artificial intelligence level of the computer opponent.

Player Nation

There are four options to choose from here, US Navy, Royal Navy, Kreigsmarine, and Imperial Japanese Navy. Choosing one of these navies affects not only the mixture of ships available, but sets values for mission mix, crew quality, fatigue, night fighting skill and battle size based on pre-set values for each nationality. During a Fantasy Campaign, a second set of buttons appear for each nation and any combination of opponents can be selected except for a nation against itself. In other words, the Kriegsmarine could fight the IJN, but the IJN cannot fight itself.

Campaign Length

There are four possible lengths for a Historical Campaign, Mini, Short, Medium, and Long. Only the Royal Navy and Kreigsmarine have a mini campaign, however. Another important difference is that turns in a US vs. IJN campaign are weekly, while turns in a RN vs. KM campaign are monthly.

Campaign length in a Fantasy Campaign is handled a bit differently.

When the Fantasy Campaign setting is selected, the Campaign Length buttons are replaced with four new options: Game Length, Start Date, Battle Size, and End Date. Arrow buttons at the end of each setting allow each setting to be changed at will.

Game Length, Start Date and End Date

These fields are all linked, so that if the value in one is increased beyond the parameters of the other two, they change to match.

Game Length is measured in turns, each turn being equal to one month. Fantasy Campaign games can last from ten to forty turns/months.

Start Date can range from September '39 to March '42. End Date ranges from June '40 to December '42.

Battle Size

This value, which ranges from one to ten, is compared to the Difficulty setting to create the probability for any particular sized mission. A high Battle Size setting and a high Difficulty setting is the most likely to generate a large battle.

High Score

The High Score button displays a screen with the ten most recent high scores. Each line displays the player name and score, the nationality of player and the opponent, and the difficulty level of the campaign. A version of this screen appears at the end of each campaign for the player to enter their name into their list if the score is high enough.

Cancel

This button exits to the Main Menu.

Continue

This button proceeds with the campaign game you have set up.

Fleet Management Screen

The Fleet Management screen is effectively a fleet database for viewing information about ships under your command, assigning ships to various duties, and evaluating your performance in the campaign so far.

In the upper-left corner are the flags of the opponents, with the human player always appearing to the left and the computer player always appearing on the right. In the upper-right corner is a panel listing the current turn, the ending date of the campaign and your victory point total.

Fleet Database

Your pool of ships, or fleet, appears across the center of the screen in columns, and display each ship's type, name, status, crew quality, fatigue, and night fighting capability. The legend icon at the top of each column is actually a button that allows you to sort the ships in your fleet by that particular function. For example, if you wanted to sort your ships by name, left-clicking on the Name button would sort your ships alphabetically by name.

In addition, there are three buttons in the center of the screen across the top, which display the fleet based on one of three criteria.

All Ships . . . . Displays all ships remaining in your fleet.

Available Ships . . . . . Displays only those ships which are ready to sail — reinforcements. Ships that have been sunk or are undergoing repairs are not listed.

Inactive Ships . . . . . . Displays only ships in repair and reinforcements

The six buttons above each column sort the fleet in the following manner.

Type . . . . Displays the fleet alphabetically by type.

Name . . . . Displays the fleet alphabetically by ship name.

Status . . . . Displays the fleet by status; Ready, In Port, Repair, sub divided by type.

Crew Quality . . . . Displays the fleet by Crew Quality rating, highest to lowest.

Fatigue . . . . Displays the fleet by level of Fatigue from lowest to highest.

Night Fighting . . . . . . Displays the fleet by Night Fighting rating, highest to lowest.

Ship Data

Each line of the fleet database displays several pieces of information, as described previously. The ship's type, name, status, crew quality, fatigue, and night fighting rating. Each line has two active functions, the Type/Name button and the Status button. Left-clicking on the Type/Name button, for example BB California displays FIGHTING STEEL'S ship viewer entry for that ship (see *Ship Viewer* on page 53).

Ship Status

The second column displays the ship's status. This button can display one of four legends, Ready, In Port, Sunk, or a date.

• Ships that are Ready are "on patrol" and available to take part in a battle.

• Ships that are In Port are not available for battle.

• Ships whose status buttons are dark and display a date are reinforcements or are being repaired. The date listed is the earliest possible date they may become available. Placing the cursor over the date causes hot-text to appear defining whether the ship is a reinforcement or being repaired.

Left-clicking on Ready or In Port toggles the status of the ship between those states.

Crew Quality

Crew quality has an effect on various aspects of battle such as reload time, accuracy, damage control. Crew quality has a four step range: Green, Average, Veteran, and Elite. The higher the level of crew quality, the better the performance. Several things can cause a ship's crew quality to improve or degrade during the course of a campaign, although crew quality can never exceed one higher than the nation's historical value.

• Crew quality improves one step for each battle the ship takes part in.

• Crew quality has a 33.3% chance to improve for each monthly turn spent at Ready status. In campaigns with weekly turns, there is a 8.3% chance.

• Crew quality has a 33.3% chance to degrade for each month spent In Port. In campaigns with weekly turns, there is a 8.3% chance.

Checks to improve or degrade crew quality are made every turn, whether weekly or monthly, for all ships which are Ready, In Port or being repaired.

Crew Fatigue

Crew fatigue has an effect similar to crew quality. Fatigue has a four step range: Fresh, Normal, Tired, and Fatigued. Crew fatigue is likely to degrade while the ship is active and improve while the ship is being repaired or is In Port.

• Crew fatigue degrades one step for each battle the ship takes part in.

• Crew fatigue improves one step each month the ship is In Port. In campaigns with weekly turns, there is a 25% chance.

• Crew fatigue has a 50% chance to degrade for each monthly turn spent at Ready status. In campaigns with weekly turns, there is a 12.5% chance.

Checks to improve or degrade fatigue are made every turn, whether weekly or monthly, for all ships which are Ready, In Port or being repaired.

Night Fighting Skill

A ship's night fighting rating modifies how well the ship fights at night. The higher the rating, the better the ship will perform. Night fighting has a four step range: Poor, Average, Good, and Expert. Night fighting ability has a 25% chance to increase if it takes part in a night battle. This ability can never exceed two levels higher than the nation's historical value.

Initial Values

At the beginning of every campaign, all the ships are assigned values for crew quality, fatigue, and night fighting based on historical values for each navy. This value varies over time, so that early war values may be higher or lower than late war values depending on the navy, because of morale, losses in men or materiel, or other factors. Reinforcements always start at the historical level minus one.

These assignments use the following formulas:

Crew Quality and Fatigue Initial Values

25% are at the historical level plus one.

25% are at the historical level.

50% are at the historical level minus one.

Night Fighting Initial Value

25% are at the historical level plus one.

50% are at the historical level.

25% are at the historical level minus one.

Fleet Status Panels

The bottom third of the Fleet Management screen shows the current status of the fleet, summarized in order of importance and divided by type.

Minimum Ships Required

This line displays the minimum number of ships in each type that must be in Ready status in order to prevent being penalized each turn. If the minimum is not met, a penalty box pops open to display the number of penalty points to be assessed. **Note:** The penalty doubles each additional turn that passes, 100 points the first turn, 200 points the second, 400 points the third, and so on. If the proper minimum number of ships is at Ready status the turn following a penalty, the amount of any new penalty resets to 100 points.

Penalties are deducted directly from your victory point total as soon as a turn passes where the minimum is not at sea, regardless of whether there is a battle or not. There may be times when you must have a fatigued or less than skillful crew put to sea in order to meet this minimum.

Ready Ships

This line displays the number of ships that are at Ready status, divided by type.

Available Ships

The number of ships that are either In Port or at Ready status are listed on this line.

Repairing Ships

This line lists all ships being repaired, divided by type. Use this line to narrow you search when looking for ships due to return from repair in the database.

Reinforcement Ships

This line lists all ships due as reinforcements.

Sunk Ships

These are all your losses.

Save Game

This button opens a menu where the game can be named and saved.

Cancel

This button exits to the Main Menu.

Continue

This button processes a turn.

Campaign Game Turn

When you left-click on the **Continue** button, FIGHTING STEEL checks to see if you have the minimum number of ships at Ready status and penalizes you if you do not. Next, the game checks to see if a battle is to be fought. If there is no battle, then crew quality and fatigue ratings are updated, and reinforcements and ships in repair are checked for readiness. A panel declaring that there is no battle this turn is displayed and the view reverts to the Fleet Management screen.

Battle Options

Once a battle is to be fought, you are presented with the option of playing in Standard mode or Division Commander mode. You may also change the preference items.

Campaign Scoring

Once the last turn of the campaign is played, your score is tabulated, and the High Score screen appears. There are ten positions for a high score, each of which displays the player's name above the points scored, the player's nation, the opponent nation, and the difficulty level.

Below that is the "scorecard" panel, which displays the specifics of the campaign you just fought. The first line is exactly like the high score lines, with name, point total, opponents, and difficulty level. This line appears as one of the top ten if enough points were scored to place it there. Below that is a tally of the level of victory or defeat, the total points scored, and the number of battles actually fought. This is followed by a tally of the ships sunk for both sides divided by type.

■ WINNING THE GAME

A scenario ends as soon as one of these conditions occurs:

• All of one side's ships are sunk, sinking, or disengaged.

• The scenario's time limit expires. There is a one-third chance the scenario will end on the first listed time (per the Briefing screen), a one-third chance it will end 15 minutes after the first time, or a one-third chance it will end at the final listed time. If you press Accelerate End in a single-player game, the program's AI quickly finishes the battle through the time limit (the program can rapidly determine the results because it does not update the screen).

• One side Surrenders. All ships on the surrendering side are treated as sunk, and all ships on the winning side receive Mission Points as if they had completed their missions.

End Game Victory Screen

This screen appears at the end of the scenario and is similar to the In-Game Victory screen (F7). From this screen you may access the Replay feature, Briefing screen, and All Ships screen. Clicking on the Check button takes you to the Main Menu.

Level of Victory

The level of victory is shown at the top of the screen and is determined by the ratio of the Total Victory Points (VPs) of the side with the most to the side with the least. Each side's VPs are listed for Mission Points and Damage Points. If the scenario had a VP Modifier for either side, this acts as a multiplier to determine the Total VPs.

There are three levels of victory for the winning side. The ratio of Total VPs (winner:loser) decides the level of victory.

• **Decisive** – 5:1 or higher

• **Major** – at least 3:1 but less than 5:1

• **Marginal** – at least 1:1 but less than 3:1

Victory Points

All VPs are based on ship size, which is a reflection of a ship's fighting power. The normal VP value for a ship is 1/100 of its displacement tonnage. For example, a 30,000-ton BB would have a VP value of 300 points. However, these values are modified by several factors. Because of their torpedo armament, DDs are valued at 120% of their normal VP value, except IJN DDs with their exceptional Long Lance torpedoes are valued at 150%. For the same reason, IJN cruisers with Long Lances are valued at 125%, whereas cruisers without torpedoes are valued at 90% of normal. Battlecruisers are also valued at 90% because their high tonnage in part reflects their additional boilers and extra frame length more than their fighting power. Even with these modifiers in place, all you need to remember is "bigger is better."

Mission Points

Your Mission Points total reflects how well your own ships achieved their specific mission goals – bombarding, evading, escorting, or tactical transporting. See page 73, *Battle Types and Missions*. You may have a negative value in this category.

Mission Points are based on the VP value of the ship performing the mission. Therefore, the larger the ship is, the more Mission Points it can earn. For instance, a bombarding BB will earn far more Mission Points than a bombarding DD, assuming each has the ammunition and main guns to complete the mission.

Damage Points

Your Damage Points total reflects how much damage you inflicted on enemy ships. You score the highest Damage Points for sinking enemy ships – damaging a ship, even severe damage, does not count as much as putting it on the bottom. Furthermore, because VP value is based on displacement tonnage, you often earn as many VPs for sinking a single BB as you do for sinking ten DDs.

End Game All Ships Screen

Click on the All Ships button at the bottom of the End Game Victory screen to bring up the End Game All Ships screen. This screen functions much like the All Ships screen accessible during play, except the information shown on the End Game screen is the final outcome, including any After Battle Damage caused by fires and Air/Sea Control (see page 98 for a description of After Battle Damage). All ships that were still in the process of sinking are treated as sunk.

Ships are arranged numerically by divisions on the screen, with friendly divisions starting in the left column and enemy divisions starting in the right. Damage information is provided for each ship as well as VPs. Blue VPs indicate friendly points earned. You receive these for damaging or sinking enemy ships and for your own ships achieving their specified mission goals. Red VPs indicate the points the enemy won for similar reasons. Click on the Back button to return to the End Game Victory screen.

2D Replay

Play
Pause
Reverse
Stop
Forward
Trail Length
Replay Slider
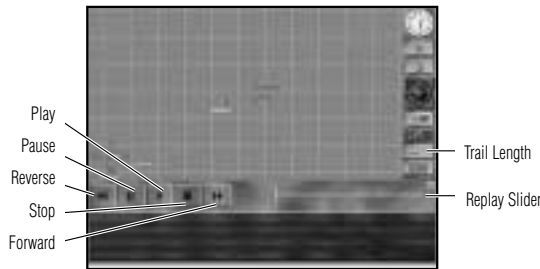
Click on the Replay button to activate this feature. The 2D map screen appears. All replay action occurs on the 2D map. Any button on the Map Control Panel that cannot be used during replay is grayed out.

The playback shows ships, divisions, and torpedoes just as in regular 2D play. You may also turn on ship trails, which shows the paths the ships/divisions have taken.

Messages at the bottom of the screen announce events such as hits, torpedo launch, ships out of action, sinking, detached, or disengaging.

In a replay of a multiplayer game, you may chat with the other players during the replay.

Click on the Back button to return to the End Game Victory Screen.

Replay Controls

The clock runs at a fixed rate until the end of the battle. Use the replay controls to manipulate the playback flow.

Play: click on this button to start the playback.

Pause: click to pause the playback.

Stop: click to reset the playback to the beginning.

Forward: hold down the left mouse press on this button to fast forward the playback at replay speed x60.

Reverse: hold down the left mouse press on this button to fast reverse the playback at replay speed x60.

Replay Slider

You may use the replay slider to the right of the controls to quickly move the playback to any time frame in the game. Click and drag the slide indicator to the point you wish playback to begin.

Replay Map Controls

You may use the following Map Control Panel buttons to change the view on the 2D map:

Mapping Mode Padlock: When locked, the view zooms out to show all divisions in the battle.

Scroll Compass: To enable the scroll compass, you must first click on the mapping mode padlock to unlock it. The scroll compass works the same as in regular 2D play.

Zoom Level: same pop-up used in 2D play.

Map Grid: same pop-up used in 2D play.

Trail Length: click on the Trail Length button and a pop-up appears. Click on 5, 10, 20, On, or Off to select the trail length and close the window. The numbers represent the length of the ships' trails in minutes (On will show the trails from the beginning of the battle). For example, select *10* to display ship trails for the last 10 minutes of battle.

■ CREATING NEW SCENARIOS

You may design your own scenarios using the Scenario Editor feature or you may have the program create scenarios for you with the Battle Generator.

Battle Generator

The Battle Generator Menu is accessible from the Scenario Selection Menu in single-player games or from the Host Create Screen in multiplayer games. The default value for every category is Historical or Random. To change a value, click on the category's label and a pop-up window appears. Click on the value you desire for that category to select it and close the pop-up.

Force A and Force B: Select a nationality for each force (or Random). RN is Royal Navy (British), KM is Kriegsmarine (German), USN is United States Navy, and IJN is Imperial Japanese Navy. If you select the same nationality for each force, they are treated as enemies.

Start Time: Day, Night, or Random.

Game Type: Historical or Fantasy. If you choose Fantasy, the program determines all Random variables without reference to historical constraints, and all ships are available at all times. For example, the British might encounter the IJN *Yamato* in the North Atlantic in 1939. If you choose Historical (the default setting), the program determines all Random variables within historical context, and ships are available according to their actual service dates.

Battle Size: Random is the default variable. A Small battle consists of 6 ships or less. A Medium battle consists of 7-12 ships, and a Large battle consists of 13-20 ships, not counting transports.

Battle Type: There are five battle types to choose from (or use the Random default): Meeting Engagement, Bombardment, Convoy, Intercept, or Tactical Transport. See page 73, *Battle Types and Missions*, for details on the different types.

Advanced Options

Battle Size Drop Down Menu

Visibility Button

Cancel Button

Continue Button

You may adjust other options in the Battle Generator by first clicking on the Advanced Options tag. The Advanced Options window then pops up. If you want to close it, click on the Advanced Options tag again.

Formation Setup: Cohesive or Random (default setting). A Cohesive setup places the ship divisions in optimal, by-the-book formation. With a Random setup, the divisions are spaced much farther apart.

Air/Sea Control: Will there be air attacks after the battle against the survivors of one side or both? The default setting is Historical. You may also choose None, Force A, Force B, Contested, or Random. If you select Historical, the result can vary, but nationality and location settings affect the chances of it being one way or another. For example, Allied nations are more likely to have Air/Sea Control than the Axis. See *After Battle Damage* on page 98 for details on how Air/Sea Control may affect the final outcome.

Visibility: Visibility is rated as 11-100% of normal. Type in a value and press **Enter,** or let the program choose a Random value by default. A night battle must have a visibility from 11-40%, and a day battle must have a visibility from 41-100%. If you enter a number outside of these ranges (for example, you enter 20% but the battle is randomly determined to be daytime), the program inserts an acceptable number when the scenario is generated. The visibility percentages in a Random setting fall within a range based on location and month settings.

Month: Select a particular month or default to Random. The month may affect weather conditions, sunrise and sunset times, and the availability of certain ships (see *Year* below).

Year: Random (default) or 1939 to 1942. If you choose Random, and the game type is Historical, the date generated will fall within historical limits: September 1939 to December 1942 in the North Atlantic, and December 1941 to December 1942 in the South Pacific. If the game type is Historical (not Fantasy), the month and year of the battle restricts what ships may be selected. Each ship has an in-service and an out-of-service date. For example, the *Bismarck* enters service in August 1940 and leaves service in May 1941 (when it was historically sunk).

Location: North Atlantic, South Pacific, or Random (default). If the game type is Historical, a Random setting for location restricts RN/KM battles to the North Atlantic and USN/IJN battles to the South Pacific. Location affects the sea state level (rated numerically on the Beaufort scale) – weather is generally worse in the North Atlantic than in the South Pacific. The chance of rain and higher wind speeds increases with the sea state level. Location may also affect visibility if the latter is set to Random. Location and month determine the sunrise and sunset times. In the North Atlantic, winter days are shorter than nights and summer days are longer than nights. However, the data is generalized for the whole North Atlantic and is not realistic for far northern latitudes or those near the equator. Similarly, the South Pacific battle area uses the same sunrise and sunset data for the whole year because it is close to the equator.

Crew Quality: Historical (default setting), Green, Average, Veteran, Elite, or Random. If you choose a setting other than Random, the program generates crew quality on a ship-by-ship basis with the level you set as the most likely value but not the absolute. The Crew Data Table on page 122 lists the most likely values for a Historical setting.

Crew Fatigue: Historical (default setting), Fresh, Normal, Tired, Fatigued, or Random. If you choose a setting other than Random, the program generates crew fatigue on a ship-by-ship basis with the level you set as the most likely value but not the absolute. The *Crew Data Table* on page 122 lists the most likely values for a Historical setting.

Night Fighting: Historical (default setting), Poor, Average, Good, Expert, or Random. If you choose a setting other than Random, the program generates night fighting on a ship-by-ship basis with the level you set as the most likely value but not the absolute. The *Crew Data Table* on page 122 lists the most likely values for a Historical setting.

Scenario Editor
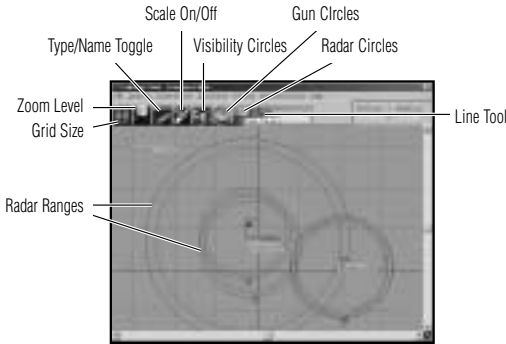
The FIGHTING STEEL Scenario Editor is accessible from the Main Menu only. It allows you to edit existing scenarios or design your own. First, you should enter the Global Scenario Data (mission and environment parameters). Then, you should create the divisions for each side, selecting the ships you want in each division, and positioning the divisions on the 2D map.

Note: When you click on a button in the editor that changes a numerical value, you can press the [e] key to scroll through the numerical values.

Scenario Editor Top Menu Bar

File: choose from New (scenario), Load (saved scenario), Save (an edited scenario), or Exit (the program). When you save an edited scenario, it is filed under the Editor Scenarios list, so be sure to click on that filter button when you go to select the scenario you want to play. (When outside of the game, you can find your scenario file in the Scenario Folder of the **Fighting Steel** directory.)

Overview: select *Global Scenario Data* from this menu to open a new screen where you choose the mission and environment settings. If you choose a Bombardment or Tactical Transport mission in the Global Scenario Data screen, come back to this menu and select *Target Circle* to place the mission target circle on the map (see page 74 for a description of *Battle Types and Missions*). The cursor changes to a cross which you click anywhere on the map to place the box.

Create Division: allows you to create divisions for Force A and Force B.

Edit Division: allows you to change some of the information you previously input for any division.

Edit Ship: allows you to change the crew and radar ratings of any ship in a division.

Reposition Division: allows you to change the start position of any division.

Help: turns help text on/off.

Menu Bar Tabs

An icon menu appears above the 2D map screen. Click on an icon to select that feature or to access a pop-up selection window.

Grid Size – Small, Medium, or Large. The scale of the grid is shown on the map, in yards.

Zoom Level – ten different map zoom levels.

Type/Name Toggle – there are four settings: Ship Type, Ship Name, Type & Name, or Off.

Scale On/Off – turns the grid size label On or Off.

Visibility Circles On/Off – turns the ships' visibility range circles On or Off.

Gun Circles On/Off – turns the ships' main gun range circles On or Off.

Radar Circles On/Off – turns the ships' radar range circles On or Off.

Line Tool – use this tool to measure the distance between ships/divisions. Click on any point A, then move the cursor to any point B and click again. The distance between the two points is shown in the Distance A to B box, measured in yards.

Global Scenario Data Screen

Click on the Overview tab of the Scenario Editor to call up the Global Scenario Data screen. Here is where you input information about your new scenario or change information in a previously saved scenario.

When you click on New in the File menu, the Global Scenario Data screen automatically opens.

If you are creating a new scenario, input data in the sections by typing in information or by selecting options from drop-down menus.

Scenario Title: the title you type in is automatically used as the file name when you save the scenario.

Description: you may type in a description for the scenario.

Mission Type: select Meeting Engagement, Bombardment, Convoy, Intercept, or Tactical Transport.

Mission Objective for Force A/Force B: when you select Mission Type, your Mission Objective is automatically entered. You cannot alter this Objective as it is linked to the Mission Type. You can change which side takes which objective.

Nation: select which navy will be force A and which will be force B. The same navy may fight itself.

Disengagement Heading Force A/Force B: choose a compass bearing from 0-359 degrees. This is the center point of the disengagement heading for that force. The actual disengagement band will be plus and minus 20 degrees from the center point.

Exceptional Victory Point Modifiers Force A/Force B: default is 1, but you may input 0.01 to 99.99. That side's Victory Points are multiplied by the value to determine the Final Victory Point Total.

Environmental Controls Window
Click on the Environmental Controls button of the Global Scenario Data screen to pop up a window where you can change the scenario*s time settings, weather conditions, and Air/Sea Control. To change a setting, click on it and a pop-down menu appears from which you make your selection. To close the Environmental Controls window, click on the OK button.

Year

Month

Wind Speed: expressed in knots. When you select Sea State (see below), wind speed is randomly calculated for each sea state level and is automatically entered. If you change wind speed, sea state also changes.

Sea State: you may select sea state 0-8. These levels are based on the Beaufort scale. Sea state 0 is a flat calm with a wind speed under 1 knot. Sea state 8 is very rough conditions with high seas and a wind speed of 34-40 knots.

Wind Direction: compass bearing 0-359 degrees. This is the direction the wind is blowing from.

Rain On/Off

Visibility: 11-40% in nighttime; 41-100% in daytime.

Radar Conditions: 0-100% (modifier to radar detection ranges). Zero shuts down all radar detection; 100% is normal detection.

Sunrise: select hour and minute.

Sunset: select hour and minute (military time).

Start Time: select hour and minute (military time).

Game Length: choose from 30 minutes to 3 hours and 30 minutes.

Location: North Atlantic or South Pacific.

Air/Sea Control: None, Force A (puts Force B at risk), Force B (puts Force A at risk), or Contested (both sides at risk).

Create Division Screen
Go to this menu tab of the Scenario Editor to create divisions for Force A and Force B. You may create up to four divisions for each side. However, the maximum number of ships you may include in a scenario is 20 total, with no more than 14 ships on one side, and no more than 10 ships in a given division.

Add/Remove Ships: click on this button to open the Add Ships screen (see below).

Change Flagship: after you have selected the ships for the division, click on the ship you want to make the flagship, then click on the Change Flagship button. A flag appears next to the selected ship.

Add Ships Screen
A list of ships is displayed on the left, which includes all of the ships in the game classified by Type, Name, Class, and Navy. Use the scroll bars to move through the list and to see more ship data. You may add any ship to a force, regardless of navy, but national characteristics are tied to the ship's historical nationality.

Click on a ship name to add it to the division list.

Remove Ship – highlight a ship name in the division list that you want to remove from the division, then click on Remove Ship.

Clear All – removes all ships from the division list.

Cancel – cancels your selections and returns to Create Division screen.

Sort ON/OFF – must be On to use the sort filters for the ship database.

Sort Ships By – when sort is On, click on Type, Name, Class, or Navy to sort the ship database in that order.

Ship Search – use this to find a specific ship by typing in its name.

Force Navy Filter – choose the specific navy you want displayed in the list, or choose All.

Keep These Ships – clicking here returns you to the Create Division screen.

Change Division Data
Click on this button of the Create Division screen to edit the following:

Heading – compass bearing 0-359 degrees.

Formation – Column, Line of Bearing, or Convoy.

Spacing – distance between ships measured in yards.

Speed – starting speed of division measured in knots.

Positioning a Division
Click on the Keep Division button to lock in your selections and return to the map screen. The mouse cursor changes to a cross. Click anywhere on the map to position your division. To relocate a division on the map, go to the Reposition Division tab on the top menu and select the division you want to relocate. The cursor changes to a cross. Click this anywhere on the map to reposition your division.

Edit Ship Window

To edit a ship's crew and radar ratings, pull down the Edit Ship tab on the top menu and select the ship whose ratings you wish to change. A ship data window for that ship appears. Click on Save or Cancel to close the pop-up after making any changes to the crew and radar quality that you desire.

Crew Quality –Green, Average, Veteran, or Elite.

Crew Fatigue – Fresh, Normal, Tired, or Fatigued.

Night Training – Poor, Average, Good, or Expert.

Radar Quality - None, Poor, Average, or Good.

■ WHAT'S BEHIND THE GAME SYSTEMS

The previous sections of the manual describe the basics of playing the game. This section provides information and details to help you make the right decisions in battle. The more you know about your ships and crews, and the more you understand what drives the game's movement, visibility, weapons, and damage systems, then the better commander you will be.

Your Ships and Crews

The database of FIGHTING STEEL includes over 90 classes of ships comprising 1,000 individual ships from the WWII navies of America, Germany, Great Britain, and Japan. These ship classes fall into six basic types, but each ship class represents a distinct combination of "steel" in the form of armaments, armor plates, engines, etc. The crews of these ships – and ultimately you as their commander – constitute the "fighting" element. You are responsible for achieving your mission objective in a given scenario, which is based on the type of battle being fought.

Ship Types

Ship Types are categorized by two-letter designations used by the USN in WWII. The game does not include ship types smaller than destroyers nor merchant-ship conversions such as the AMC (armed merchant cruiser), which were not originally designed as warships.

BB, Battleship

These capital ships carried the largest naval guns and, at the start of the war, were considered the main fleet units because they could accurately shell targets 20 miles away. (They were soon eclipsed by the aircraft carrier, which could bomb targets 200 miles away). Battleships possessed the thickest armor protection of any ship type, but the added weight of their armor compromised their speeds. In addition, they needed wide beams to accommodate their heavy guns, and this compromised their maneuverability.

BC, Battlecruiser

Conceived before WWI as heavy scouting units, battlecruisers carried fewer (or smaller) heavy guns than battleships, and they sacrificed some of the battleship's armor protection for more speed. In theory, the battlecruiser's greater speed allowed it to escape from enemy battleships, while its armor and guns allowed it to defeat enemy cruisers. For these reasons, battlecruisers were often assigned the role of com-

merce raiding or task force escort, but on the whole battlecruisers were a flawed concept on the way out. They were expensive to build, and their weaker protection made them too vulnerable in action.

CA, Heavy Cruiser

The size of heavy cruisers was limited by naval treaty after WWI, although several of the major powers secretly ignored those restrictions. Heavy cruisers were considerably smaller than battlecruisers, protected by thinner armor, and carried main guns of about 8" bore. Their design combination of fast speed, seaworthiness, and offensive power made them suitable for many missions. IJN heavy cruisers were especially dangerous opponents because of the Long Lance torpedoes they carried. The three ships of the KM *Deutschland* class were referred to as pocket-battleships, but they were nothing more than heavy cruisers with six 11" main-gun armament.

CL, Light Cruiser

These warships were smaller versions of heavy cruisers, with less armor protection and carrying main guns of about 6" bore. Theoretically, the higher rate of fire from a battery of 6" guns would compensate for the lighter shell weight and thereby match the broadside power of an 8" cruiser, but in practice the 100-lb., 6" shells lacked both the range and the penetrating power of 250-lb., 8" shells. Light cruisers made good scouts and were often used to lead or support destroyer divisions.

DD, Destroyer

These warships were the smallest and most numerous fleet units. Although faster than cruisers, they were not as seaworthy and had limited fuel spaces, so their radius of action was often restricted. Destroyers were unarmored and weakly gunned compared to other fleet units, but their primary offensive role was to deliver torpedo attacks against the enemy battleline. Defensively, they served as escorts to thwart or break up enemy attacks. The Long Lance torpedoes carried by IJN destroyers made them particularly lethal combatants.

TR, Transport

The TR type in FIGHTING STEEL represents troop transports and merchant ships carrying vital cargoes for the prosecution of the war. The game provides two classes of transports: slow ones (8-knot) of 10,000-ton displacement, and fast ones (15-knot) of 15,000-ton displacement. Transports are unarmed, unarmored, and move in convoy formation. It takes a relatively long time and much sea room for a convoy to execute a large change of course. Transports were valuable targets, and it was often the dangerous assignment of warships to escort a slow convoy of transports through unfriendly waters and protect it from harm – no matter what the cost to the warships and their crews.

Crews

A WWII warship needed hundreds of trained men to work its engines, man its guns, run the communications equipment, and do the scores of other tasks that kept it in fighting shape. Destroyers had crews of around two hundred men, while some battleships had crews of over two thousand.

The game rates each ship's crew by its Quality (experience level, ranging from elite to green), Fatigue level (fresh to fatigued), and Night Fighting skills (expert to poor). Night-fighting skills affect a ship's gunnery performance at night and how well the observers detect enemy ships in the dark. Crew quality and fatigue affect the accuracy and rate of fire of the ship's guns. They also affect how soon initial contacts are reported to the Bridge and how long it takes to identify the Type and Name of a visual Contact (see *Crew Effects on Sighting* on page 82 for more details). In addition, crew quality and fatigue affect how rapidly fires are put out and repairs made to damaged or disabled ship systems.

National Characteristics

The navies represented in FIGHTING STEEL had relative advantages or disadvantages based on their equipment and procedures that had nothing to do with the quality of their crews. Click on the National Characteristics preference to enable these characteristics (the torpedo dud rates characteristics are only used if you also select Dud Torpedoes Possible preference).

IJN, Imperial Japanese Navy

Because Japanese warrior spirit and training emphasized the offense over the defense, IJN ships often neglected damage control procedures and equipment. Therefore, repair times for IJN ships are increased by 30%, and fires on their ships are half as likely to shrink. However, the IJN did have the most advanced torpedoes of any nation in WWII, so its torpedo dud rate is only 10%.

KM, Kriegsmarine

German ships had superior optics for rangefinding and often straddled their targets after a few salvos. Therefore, KM ships receive a +20 gunnery modifier. However, KM ammunition had a higher than normal failure rate, so the chances of duds for KM shells is 30% as opposed to 10% for other navies. Furthermore, the KM experienced difficulties with its torpedoes at the start of the war, although it made improvements as the war progressed. Its torpedo dud rate is 60% in 1939, 50% in 1940, 40% in 1941, and 30% in 1942.

RN, Royal Navy

The Royal Navy includes British, Australian, New Zealand, and Canadian ships. It serves as the touchstone for National Characteristics in FIGHTING STEEL and receives no special benefits or penalties. The RN's torpedo dud rate is the standard 20%.

USN, United States Navy

The USN placed a high value on the survivability of its ships, so US warships had excellent equipment and procedures for damage control. Therefore, repair times for USN ships are reduced by 30%, and fires are twice as likely to shrink. On the negative side, USN torpedoes were notoriously ineffective during the first half of the war. Therefore, the USN's torpedo dud rate is an atrocious 80% in the game.

Battle Types and Missions

The Battle Type of a scenario determines the mission objective for each force involved and its victory conditions. There are five battle types in the game: Meeting Engagement, Bombardment, Convoy, Intercept, and Tactical Transport.

Meeting Engagement

Battleline: Force A mission – Cause more damage to the enemy than you receive.

Battleline: Force B mission – Cause more damage to the enemy than you receive.

This is a classic surface battle, one that the naval staffs of each nation planned to fight. Destruction of enemy ships is the sole victory condition in a meeting engagement. When created by the Battle Generator, the two forces are roughly equal in size.

Bombardment

Bombarding Force: Force A mission – Move your force to a position to bombard your objective while minimizing friendly losses and maximizing enemy losses.

Defending Force: Force B Mission – Prevent the enemy from reaching his bombardment location while maximizing enemy losses and minimizing friendly losses.

The two forces are roughly equal in size when created by the Battle Generator. The bombarding force should attempt to bombard enemy land facilities (this was a typical mission for the IJN in the Guadalcanal campaign of 1942). To do so, the force must reach a geographic location (target circle) by the end of the scenario. The target circle is 10,000 yards in diameter visible on the 2D map, somewhere between 20 and 30 nautical miles ahead of the force's starting position (a nautical mile is 2,000 yards). Sinking the defending force on the way to the target circle is also a valid goal, but the bombarding force should conserve HE and Common ammunition for the bombardment. If all defending ships are sunk or disengaged, the remaining bombarding ships automatically finish their mission (you don't have to move them to the target circle yourself).

The bombarding force receives a VP bonus equal to 40% of the VP value of the bombarding ship for each ship that reaches the target circle by the end of the scenario with at least 60% of its HE or Common ammo supply remaining and operable guns. The VP bonus scales down from there to 0% bonus if the ship has 10% or less of its HE or Common ammo supply remaining or no operable guns. Therefore, the larger the ship, and the more HE ammo it has, the greater the bonus. However, any enemy ship in the target circle that is not out of action or sinking cancels the bombardment bonus. Furthermore, the bombardment force starts with a Mission VP handicap equal to -20% of the total VP value of its ships. Both sides receive VPs for destruction of enemy ships.

Convoy

Escorting Force: Force A mission – Protect the transports and attempt to disengage while minimizing friendly forces and maximizing enemy losses.

Attacking Force: Force B Mission – Prevent the transports from disengaging while maximizing enemy losses and minimizing friendly losses.

The size of the escorting force is approximately 80% of the attacking force's size when created by the Battle Generator. The escorting force should try to block the attackers from destroying the transports (which are steaming in convoy formation) until all transports have disengaged in the direction of the mission's Disengagement Heading as defined in the scenario's Briefing screen ([F6]). At that time, the escorts should also try to disengage. The escorting force receives a 50% VP bonus for each transport that disengages and a 25% bonus for each of its escorting warships that disengage. The VP

bonus for a ship is based on its own VP value. Both sides receive VPs for damaging and sinking enemy ships. The challenge for the attackers is to sink the transports without leaving themselves vulnerable to the enemy escorts.

Intercept

Intercepting Force: Force A mission – Prevent the enemy from disengaging while maximizing enemy losses and minimizing friendly losses.

Evading Force: Force B Mission – Disengage from the battle while minimizing friendly losses and maximizing enemy losses.

The size of the evading force is approximately 80% of the intercepting force's size when created by the Battle Generator. In addition, the maximum speed of the slowest intercepting ship is at least as fast as the slowest evading ship. The evading force should attempt to disengage in the direction of its Disengagement Heading. It receives a 25% VP bonus for each ship that disengages based on the VP value of that ship. Both sides receive VPs for the destruction of enemy ships.

Tactical Transport

Transporting Force: Force A mission – Move your force to a position to unload its supplies while minimizing friendly losses and maximizing enemy losses.

Patrolling Force: Force B Mission – Prevent the enemy from unloading its supplies while maximizing enemy losses and minimizing friendly losses.

The size of the transporting force is approximately 80% of the patrolling force's size when created by the Battle Generator. This battle type recreates the kind of mission the IJN frequently ran at night to re-supply Japan's ground forces at Guadalcanal (Americans called these supply runs the Tokyo Express). The transporting force contains DD-only divisions (though IJN divisions may include CLs). The transporting ships are encumbered with a cargo of supplies, which handicaps their gunnery and damage modifiers.

To unload its supplies, an encumbered ship must first reach the target circle, which is a 10,000-yard by 10,000-yard square visible on the 2D map, approximately 10 to 15 nautical miles ahead of the force's starting position (a nautical mile is 2,000 yards). After reaching the target circle, the ship must reduce speed to 10 knots or less and not maneuver so as to drop the supplies and become unencumbered. The transporting force receives a 50% VP bonus for each of its ships that becomes unencumbered (the bonus is based on the ship's own VP value). Both sides receive VPs for the destruction of enemy ships. If all patrolling ships are sinking, out of action, or disengaged, the remaining transporting force is automatically considered to finish its task (you won't have to move the ships to the target circle yourself).

Movement System

Every ship in FIGHTING STEEL is rated for maximum speed, acceleration, deceleration, and turning, but the principal maneuver unit in FIGHTING STEEL is the division. A division comprises one or more ships, and they can be of different classes or even different types. The ships of a division move in synchronization, either by following the course of the leading ship in the division (column formation) or by paralleling the course of the division's flagship (line formation).

Maximum Speed

Ship speed is expressed in knots. As a general rule, the smaller the ship is, the faster it can go. However, a ship's maximum speed is affected by damage and sea state.

Damage: Engine (Propulsion system) damage lowers a ship's maximum speed by an equivalent percentage, so if the engines are down to 80%, the ship's maximum speed is reduced to 80%. Flotation point damage also lowers a ship's maximum speed by half of the percentage of flotation point damage (see *Flotation Points* on page 92). For example, if the ship's flotation point damage is 50%, then its speed is reduced by a quarter to 75%. Both factors apply, so a ship whose original maximum speed was 30 knots but whose engines were down to 80% and whose flotation point damage was at 50% would have a maximum speed of 30 knots x 80% x 75% = 18 knots. If a ship's engines are destroyed, it decelerates until it stops.

Sea State: Sea state is based on the Beaufort scale, which defines prevailing weather conditions. Invented in the late eighteenth century, the Beaufort scale is an internationally recognized measure of sea state based upon wind speed and wave height. The scale is measured in levels, from Level 0 (Calm; no wind, no waves) to Level 12 (Hurricane; 109-116 knot winds, 16 meter waves). In FIGHTING STEEL, combat is allowed to take place in sea states up through Beaufort Level 8 (Gale; 34-40 knot winds, 7 meter waves).The Environment Panel on the Briefing screen lists the current sea state level. Sea state may limit the maximum speed of ships (it also affects gunfire accuracy and reload times).

Sea State Limits to Maximum Speed (in Knots)

SEA STATE	SHIP TYPE BB/BC	CA	CL	DD	TR
4	35	35	35	35	25
5	32	30	30	30	20
6	29	27	26	25	15
7	24	22	21	20	10
8	20	17	16	15	10

Acceleration and Deceleration

The typical WWII warship was powered by steam-driven turbines that turned long shafts on the ends of which were huge propellers. To move such a massive object as a ship required equally massive power, and once momentum was gained it was slow to stop, though a ship could reverse its engines to help brake its progress (ships may not steam backwards in the game, however).

Each ship class has been assigned an acceleration rate and a deceleration rate (expressed in knots per minute) based on its basic type: BB (which includes BC), CA (which includes CL), DD, and TR. Except for transports, each ship class is rated as fast, normal, or slow within its type. Destroyers have the highest acceleration and deceleration rates, followed by cruisers, and then battleships. Because they can reverse their engines, the warships decelerate slightly faster than they accelerate. Transports have the lowest rates and decelerate slower than they accelerate. Acceleration and deceleration rates are fixed, except that a ship that is changing course cannot accelerate while turning. Furthermore, flotation point damage to the ship also reduces its acceleration and deceleration rates – see *Flotation Points* on page 92.

Changing Course

A division may change its heading (expressed in compass degrees) by turning in column or simultaneously. FIGHTING STEEL replicates the actual procedure used by navies to change course. The division commander selects a new heading that is announced to all ships in the division by radio (something the USN called "signal in the air" from the days when a signal flag was raised to alert the ships to a course change). Each ship in the division confirms the receipt of the order. Once all ships have confirmed the receipt, the division commander sends a message to execute the order. This is the way navies have done it for hundreds of years (using flags before radios replaced them), and not surprisingly this is the most efficient way we could think of for you to maneuver your ships.

In the game, once a course is locked in, a new course cannot be implemented until the maneuver is complete. In reality, a course change could be ordered at any time, but it would take a while to be implemented, especially when ships in the division were trying to maintain formation in the current maneuver. It would also cause considerable confusion to the ships in the division and possibly result in some ships not executing the order correctly. Because of this, division commanders were hesitant to interrupt a maneuver in progress with another maneuver, so the game does not allow it. However, it is relatively easy for ships in column formation to play "follow the leader," so you may issue a new course to the lead ship of a column after it completes a turn even if the tailing ships have not finished the maneuver.

Turning Rate

Each ship class in the game has been assigned a turning rate based on its basic type: BB (which includes BC), CA (which includes CL), DD, and TR. Except for transports, each ship class is rated as nimble, standard, or sluggish within its type. Destroyers have the best turning rate (defined by diameter in yards), followed by cruisers. Battleships are poor turners by comparison, and transports are the worst. The speed of the vessel also affects its turn rate, with lower speeds permitting a tighter diameter and higher speeds requiring a greater one. The percentage of a ship's flotation point damage may increase its turn rate as well – see *Flotation Points* on page 92. For example, an undamaged nimble DD steaming at 15 knots may turn 180 degrees along a 500-yard diameter, but a sluggish BB with 26% flotation point damage and steaming at 25 knots would complete a 180 degree turn on a 1,500-yard diameter. Clicking on the Hard (Emergency) Turn icon on the Navigation Panel reduces the turning diameter to 75% of normal, but there is a 1% chance that the ship's steering (Maneuver system) will lock in that position until Damage Control repairs it.

Mistaken Maneuver

When the Mistaken Maneuver realism preference is set, every time a maneuver order is executed, there is a chance (based on crew quality and fatigue) that a ship will fall out of the division and execute a maneuver other than the one ordered. For example, it may turn in the wrong direction or continue going straight ahead, or execute a simultaneous turn instead of a column turn or vice versa. The chance of this happening is increased if the maneuver is an emergency turn. Also, at night the chance of a mistaken maneuver happening is greater and is modified by Night Training abilities. The chance of a mistaken maneuver occurring is checked independently for each ship

in the division other than the flagship (which always performs the maneuver), so it could happen to multiple ships in a division on the same maneuver.

The base chance of a ship missing the maneuver is -1%. Modifiers to this are as follows:

Crew Quality: Elite –2%, Veteran –1%, Average +0%, Green +2%.

Crew Fatigue: Fresh +0%, Normal +1%, Tired +2%, Fatigued +4%.

Nighttime: +3%.

Night-Fighting: (night battles only) Expert –2%, Good –1%, Average +0%, Poor +2%.

Division Speed: If division speed is greater that 60% of its original maximum speed, the following modifiers apply: 60-70% speed = +1%, 70-80% speed = +2%, 90-100% speed = +4%.

Emergency Turn: The percentage chance of a mistaken maneuver, after all modifiers have been applied, is doubled.

Division Formations

Handling ships in strict division formation may seem rigid or too parade-like to some people, but a group of WWII warships needed to concentrate in a tight group to project its offensive power to maximum effect. Rigid formations also allowed the commander to maintain better control of the group, which was essential during battle. When you gather many ships that are the size of small islands into a limited area, and each of them needs extensive room to turn or stop, then a rigid formation is the only way to avoid collisions. This naval custom of warship formations dates back for millennia and has changed only to accommodate technological improvements in ship propulsion, communication, and weapon systems.

The maximum speed of a division is the maximum speed of the slowest ship in it. The acceleration rate, deceleration rate, and turn rate of a division are one level below that of the worst ship in the division to reflect how each ship must make slight adjustments to keep station within the division. (This rule does not apply to single-ship divisions obviously.)

Column Formation
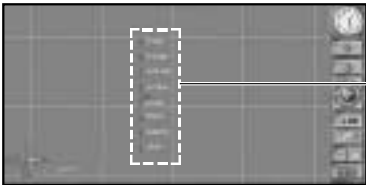
Division in Column

Ships in column formation are lined up front to back and play "follow the leader." This formation maximizes the unblocked arcs of fire for weapons (guns and torpedoes) to either side of the battleline. A divisional column is only at a disadvantage if the enemy caps its T by steaming across the column's path (in front or behind) where most of the column's weapons are blocked from firing.

If the division turns in column formation, each trailing ship only begins its turn when it arrives at the exact point where the lead ship began the turn. A division in column formation may also turn simultaneously, in which case the ships turn together and enter line formation. However, a simultaneous turn of 180 degrees allows the column to quickly reverse course and reform in a new column steaming in the opposite direction. The previous lead ship is now at the rear, and the previous rear ship is now in the lead.

Line Formation
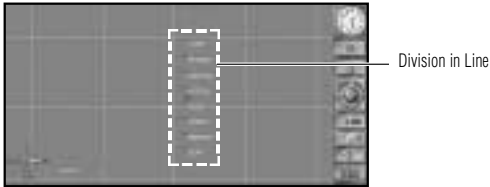
Division in Line

Ships in line formation are steaming on the same bearing on parallel paths. Such a formation increases the likelihood of sighting other ships because it covers a broader front than a column formation. The widest front for the division occurs when the line formation is perpendicular to a column formation, so that each ship is directly opposite the next. However, such a bearing blocks the broadside arcs of fire of the ships in the middle of the formation. A bearing that staggers the ships in echelon is often better. The front of the division in echelon is narrower, but it opens up the broadside arcs of fire, and the division can more rapidly reform into a column formation.

Ships in line formation always turn simultaneously. A division in line can return to column formation on one of two headings that are compass opposites (clicking on the Reform Column icon of the Navigation Panel automatically selects the one course that is closest to the division's current line of bearing).

Detachment from Division

In FIGHTING STEEL, you may detach any ship from its parent division, thus creating a new single-ship division. See *Detaching a Ship* on page 33. You usually want to do this when a damaged ship is handicapping the speed or turning ability of the entire division.

You may never attach a ship to another division in battle. This is purposeful to discourage you from detaching ships except for very good reasons. In the chaos of battle, formations tend to fall apart, not coalesce into something better. Furthermore, the ships of a division were used to working in formation with each other, and it would be unrealistic to expect a new ship to fit in smoothly with them (or them with it) in the middle of a battle.

Evasive Maneuvers

Ships would maneuver evasively (make erratic course changes) to confuse the enemy's aim. This often meant "chasing" the waterspouts of enemy salvos so that the ship moved toward the last fall of shells while the enemy gunners supposedly adjusted their range to land the next salvo farther away (if the previous salvo fell short) or closer (if the previous

salvo fell over). Clicking on Evasive Maneuver for your division or ship recreates this effect, but there is no graphic display of the maneuver on the screen (the program handles it internally). Erratic course changes also threw off the evading ship's aim. Therefore, your own ship's gunnery chance to hit is reduced 20%, but the chance of enemy shells hitting your ship is reduced 30% (see *Gunnery Modifiers* on page 88). To account for the curving path of the maneuver, your ship's forward movement is reduced by 20% (its speed is unaffected, but its movement from point A to B takes longer).

Visibility System

The visibility system simulates the difficulty of spotting targets at extreme ranges. In the days before radar, ships could only use optical means for detecting enemy units. Intelligence-gathering capabilities and unit identification similarly depended on what could actually be seen. Various environmental factors, such as lighting conditions, had a great impact on the range at which a unit could be detected on the horizon. With the advent of primitive, and later advanced, shipboard radar systems, both ships and aircraft could be detected at ranges greater than optically possible. While this extended the range at which a unit could be detected, it was still necessary to physically observe the unit to obtain positive identification (and avoid the friendly-fire incidents so common in WWII).

In FIGHTING STEEL, weather conditions are determined at the start of the scenario. The same weather conditions apply evenly in all directions. For example, a hazy, moonlit night is hazy and moonlit to the same extent no matter where your ship is.

Visual Sighting

If a target comes within your ship's visual detection range (which varies depending on the class of observing ship and target ship), it is detected. The curvature of the earth's surface defines the upper limits of sighting – that was as true in WWII as it was in Nelson's day. Large ships can spot objects farther away because their observers are placed in higher locations than in small ships. Also, because large ships are taller than small ones, their superstructures can be seen over the horizon sooner. These factors are taken into account in the visual detection ranges data. Environmental factors, such as fog, are then applied to lower the base detection ranges for the given scenario to reflect the impact of reduced lighting conditions.

Standard Visual Detection Ranges (in Yards)

TARGET	OBSERVER BB/BC	CA/CL/TR	DD
BB/BC	36,000	32,400	28,800
CA/CL/TR	32,400	29,160	25,920
DD	28,800	25,920	23,040

A ship is first sighted at initial visual detection range, which is 90% of standard (this accounts for the time it takes the observer, who is scanning the horizon, to spot the ship after it crosses the threshold). The Environment Panel of the Briefing Screen lists the initial visual detection ranges for the scenario you are playing. Once sighted, contact will not be lost until the ship exceeds maximum visual detection range, which is 110% of standard (the observer knows where to look and can keep his eyes on the target).

The highest level of sighting information gathered by the ships under your command is displayed in the ID tags. However, individual ships maintain their own target information data, so what one ship knows about a target may be different from what another ship knows (see *Target Information Level* on page 82).

Smokescreens

Ships may lay smokescreens to block visual line of sight (smoke has no effect on radar sighting). Smoke is created in sections with a 10-yard radius. The smoke sections drift at the speed and direction of the wind (the Environment Panel on the Briefing screen lists the direction the wind is blowing from and its speed). Each section lasts for five minutes before dissipating, but wind speeds over 15 knots will dissipate it up to 75% faster.

Radar Sighting

In FIGHTING STEEL, the main effect of radar is to increase the range at which a unit is initially detected. Radar allows a target to be tracked (once spotted) out to the maximum range of the radar. Advanced radar systems are used to assist in gunnery (see *Gunnery Modifiers* on page 88). However, your ships may never fire at radar-only targets. The US Navy did not begin using radar to fire at unseen targets until very late in 1942. Radar-directed fire at that time was quite ineffective because they could not see the fall of their shells to adjust the fire accordingly.

Standard Radar Detection Ranges (in Yards)

TARGET	OBSERVER		
	BB/BC	CA/CL/TR	DD
BB/BC	45,000	40,500	38,250
CA/CL/TR	40,500	36,450	34,425
DD	38,250	34,425	32,513

The quality of the radar affects these ranges. Good radar produces 90% of the theoretical standard, so it achieves initial radar detection at 81% of range (90% for good multiplied by 90% for initial) and loses contact if the target exceeds 99% (90% for good multiplied by 110% for maximum detection range). Average radar produces 60% of the theoretical standard, and bad radar produces 30%. Sea state, as measured on the Beaufort Scale, affects radar transmission and reception (high waves caused interference, and the radar aerials were not gyro stabilized). Sea states 0 to 2 cause no effect. Radar ranges are reduced by 10% in sea state 3, 17% in sea state 4, 24% in sea state 5, and 30% in sea state 6. Radar is shut off in sea states 7 and higher. Furthermore, rain reduces radar ranges by 30%.

Ground Clutter

Even though no land is shown in the game, effects of land proximity are accounted for in the radar condition value found in the Environment Panel of the Briefing screen. Nearby land creates a radar shadow that inhibits radar transmission and reception. If the radar condition value is below 100, ground clutter is present and reduces standard radar detection range by that percentage. For example, if the radar condition is 25, standard radar detection ranges are only 25% of normal.

Target Information Level

When a ship is first spotted, it is an unidentified contact. It could be friendly or enemy. The closer the ship comes to the observer, and the longer it is observed, the more information is gathered about it. There are three information levels: Contact, Type, and Name. Information levels are not increased beyond Contact for radar sightings until the ship comes within maximum visual detection range for the current environmental conditions. The target ID tags are updated according to the best information available to your ships as a whole, but each ship maintains its own information level data.

Contact: You know the distance, bearing relative to your ship, and the course and speed of the contacted ship.

Type: After watching a target for a given track time (which is 80 seconds modified up or down by range percentage, crew quality, and crew fatigue values), your observers determine its general type: BB (which includes BCs), CA (which includes CLs), DD, or TR.

Name: After observing the target for twice the track time needed to identify its Type, your observers identify the ship's name and extent of damage.

When a Target Goes Out of Sight

When a target goes out of sight (for instance, behind a smokescreen), all of the information your observers acquired is not immediately lost. However, the information so patiently gathered is linked to track time (the length of time that the ship has been observed), and track time is reduced at three times the rate of gathering it when the target goes out of sight. If the target reappears before the accumulated track time value reaches zero, your observers re-acquire the target at the reduced level. Otherwise, all information about that target is discarded.

Crew Effects on Sighting

A tired or poorly trained crew lacks efficiency in sighting. Therefore, the quality and fatigue level of your crewmen affects how long they must observe the target (track time) before they gain a higher information level about it. It also affects how soon they report the initial contact, which represents the time it takes to pass the information up the chain of command. The base report delay is 40 seconds for visual sighting (longer for radar sighting). If the ship's Bridge is damaged, the delay is increased by 25 seconds. The program then adds the following modifiers:

Crew Quality Delay: Elite –20 seconds, veteran –10, average +0, green +20.

Crew Fatigue Delay: Fresh +0 seconds, normal +10, tired +20, fatigued +40.

During night battles, the crew's night-fighting ability also affects its visual sighting range. A crew with expert night-fighting ability has its visual sighting range increased by 20%. Good night-fighting ability increases the visual sighting range by 10%, average has no effect, and poor night-fighting ability reduces the range by 20%.

Night vs. Day Visibility

Current visibility for night or day is set at the start of the battle. The program then randomly generates another visibility setting for day or night, whichever is not current. This second visibility setting is only used if the sun rises or sets during the battle. Day

visibility can be anywhere from 41 to 100%; night visibility can be 40% or less. The Environment Panel on the Briefing screen lists when the sun rises and sets. Visibility decreases at dusk and increases at dawn as follows:

From 30 minutes before sunset to sunset, visibility decreases in equal increments from day setting to 40%.

From sunset to 30 minutes after sunset, visibility decreases in equal increments from 40% to night setting.

From 30 minutes before sunrise to sunrise, visibility increases in equal increments from night setting to 40%.

From sunrise to 30 minutes after, visibility increases in equal increments from 40% to day setting.

Illumination

Starshells and searchlights produce localized areas of light to assist ships in sighting the enemy at night. Recognition lights, gunfire, and fires from damage also make a ship more visible at night. Except for recognition lights, all of these illumination effects are cumulative. The program also applies a random factor to recreate a flickering effect.

Illumination has no effect in daylight, nor does it improve the limits of visibility in rainy conditions. There were occasions in WWII when aircraft dropped flares and float lights to illuminate enemy ships, but these are not used in this game.

Starshells

Starshells are light producing munitions launched high in the air that burn for a limited period of time as they descend on a parachute. Naval gunners used starshells to help them see their target and partially negate nighttime visibility restrictions. Starshells provide a visibility bonus within the area lit by the shell. This modifier varies up or down according to range.

Starshells illuminate a circular area 2,000 yards across (the 2D map display uses a yellow circle to show the perimeter of illumination). Unlike a searchlight that can follow its target, starshells light up a given area. Thus the target may move out of the area, avoiding the illumination effects. (In real life, starshells also silhouetted units to a range of 10,000 yards from the center of effect, but this is not accounted for in the game.)

When you turn on the starshell function, the ship launches a starshell at the target you have selected either from division or single-ship level. All ships have unlimited starshells. When a starshell burns out, another is automatically fired, assuming you have a target selected. If two or more ships select the same target, only one will fire the starshell.

Starshells burst over the target you have selected. Starshell illumination lasts for 200 seconds plus or minus 30 seconds. One secondary turret (or one main gun turret for ships with no available secondary gun turret) is assigned to fire starshells at a single target until you take the ship off that mission (one starshell in the game actually represents round after round of starshells in real life).

Starshells cannot be used against ships closer than 4,000 yards (unlike regular munitions, the starshells are not fired directly at the target but in high, mortar-like trajectories

so they descend on the target; thus the maximum degree elevation of the firing tubes limits how close the target can be). If the target is closer than this, the program works down the priority list until a suitable ship is found outside the 4,000-yard limit.

When your ship fires a starshell, the firing ship itself receives a visibility modifier (depending on the size of the gun), the same as when it fires other types of ammunition at night.

Searchlights

Searchlights are large lights mounted on the ship that produce narrow cones of light to be focused on a target. Searchlights spotlight the current target that you have selected at division or single-ship level. When the searchlight function is turned on, the searchlight sweeps over and locks onto the target. This must be a target currently sighted by visual detection or radar. The searchlight sweeps horizontally at 10 degrees per second. The maximum range of a searchlight is 5,000 yards, but its effects can be seen out to 20,000 yards.

The information level of a target illuminated by searchlights immediately increases to Name level (the observers can more easily identify the ship).

The one problem with using searchlights is that they also make your ship easier to see. A visibility modifier (which varies up or down according to range) is in effect against your ship when its searchlights are on. This increases the chance of the enemy sighting your ship and being able to target it. However, you gain a visibility modifier against your target that is slightly better than the one applied against your own ship. So you must decide whether to risk being spotted in order to improve the chance of a hit against your target. Multiple searchlights on the same target have no additional effect.

Searchlight positions can be destroyed by superstructure hits (see *Superstructure Hits* on page 95). All ships except BBs and BCs have one searchlight position on each side of the ship. BBs and BCs have two searchlight positions on each side of the ship. The second position serves as a backup if the first is destroyed (it does not provide increased illumination).

Recognition Lights

Recognition lights are colored lights that a ship may turn on to assist in identifying it as friend or foe. Recognition lights are useful when playing at the Division Commander mode to avoid being fired on by friendly ships that are not under your command and which have identified your ship as an enemy Contact only. While these lights allow your friends to more rapidly recognize your ship, they also make it more visible to your enemies. Recognition lights can be turned on or off for individual ships or divisions. Recognition lights allow you to gain greater intelligence about an unidentified ship's nationality at a greater distance. The visibility modifier varies by range, and the maximum range the lights can be seen is 10,000 yards. They have no effect during daylight. When a ship using recognition lights is sighted, its nationality is immediately identified in the ID tag. This may result in a Contact that lists nationality before either its Type or Name is known.

Each nationality has a different set of colored lights on its ships. These lights are placed one on the bow, one on the stern, and one on each side of the superstructure. USN ships have blue recognition lights, RN have white, IJN have orange, and KM have red.

Gun Flashes

The flashes of a ship's guns at night reveal much about its location. Flashes can be spotted out to the maximum visibility range. The number of guns firing and the size of the guns determine the visibility modifier, which is further modified by distance. Guns over 11" bore create the most visible flash, and guns under 5.9" bore (those that fire common ammunition) create the least.

Visible Fires

A ship with fires on board is more visible at night. Such a ship has a visibility modifier equal to 10 times the number of fires currently raging on it. Fires can be spotted out to the maximum visibility range.

Weapon Systems

The warships presented in FIGHTING STEEL carry two types of weapon systems: guns and torpedoes. All of the warships carry guns, but not all of them carry torpedoes. You may also damage a ship by ramming it with your own, but that is a tactic, not a weapon system, and it is not a *winning* tactic either, especially if the rammed ship is larger than your own – see *Collision Damage* on page 97.

Naval Guns

The game accounts for all sizes of WWII naval guns, from the monstrous 18.1"-bore weapon shipped on the IJN's *Yamato* class to light cannon and machineguns carried on most ships for antiaircraft defense. Because it is easier to transport heavy objects over water than over land, WWII battleships could carry batteries of guns that made the "heavy" guns of contemporary armies look puny by comparison. The largest guns on these ships fired shells weighing over a ton each.

For game purposes, gun armament is divided into four classes: Main Guns, Secondary Guns, Tertiary Guns, and Close-In Weapons. You control the main and secondary guns; the program automatically handles the tertiary and close-in weapons. Main and secondary guns are identified in the Gun Data Table on page 123 by bore size (diameter in inches) and by caliber (ratio of barrel length to diameter).

Gun Class

Main Guns: These are the largest guns carried on your ship. They fire the heaviest shells for the longest range. Main guns are located in armored turrets (one to four guns per turret), which are arranged in centerline positions that can fire to either broadside. However, a few classes, such as the USN's *Atlanta* and the RN's *Emerald*, carry some of their main guns in wing turrets that can fire to only one broadside. The ship's superstructure also restricts which main turrets may fire forward or aft.

Secondary Guns: These are the next-to-largest guns carried on your ship that were used in the antisurface role. Destroyers and some cruisers do not have secondary guns. Secondary batteries are arranged in port and starboard turrets that provide some protection to their guncrews. A few ships, like the *Yamato*, also have forward- and aft-firing secondary turrets. Because secondary guns had lower-quality rangefinders and poorer fire control compared to main guns, they receive a –40% penalty to their fire (see *Gunnery Modifiers* on page 88).

Tertiary Guns: Some battleships carry a third level of antisurface guns (dual-purpose guns, actually). These guns are arranged in port and starboard batteries that automatically engage the nearest enemy ship within 5,000 yards. Tertiary guns never inflict system hits (see page 95 for *Damage to Ship Systems*).

Close-In Weapons: Most guns under 4" bore are treated as close-in weapons that automatically engage the nearest enemy ship within 3,000 yards. They inflict slight Hit Point damage on the target and do not cause system hits. A ship's close-in weapons are disabled by a percentage equal to its hit point damage percentage.

Ammunition

Warships carry limited amounts of ammunition – approximately 100 rounds per heavy gun and 200-300 rounds for smaller guns (the smaller weapons have higher rates-of-fire). Generally, the greater the bore size, the greater the weight of the shell; and the greater the weight of the shell, the more likely it will penetrate the armor of its target. Also, the heavier the shell is, the more damage it will do. (See the Gun Data Table on page 123 for shell weights and base penetration values.)

Each warship in the game has two main gun magazines, and each main gun turret is linked to one of those magazines. If a main magazine is knocked out, it stops the ammunition flow to those turrets (assuming a magazine explosion does not sink the ship!). Secondary guns are fed from a secondary magazine that cannot be destroyed in the game (in reality, the secondary guns actually drew from several magazines).

Guns of 5.9" bore and greater have a choice of armor-piercing (AP) and high-explosive (HE) shells. HE shells cause twice as much damage but only penetrate the same thickness of armor 40% as often as AP shells. They are most useful against unarmored targets such as destroyers and transports. Shells of 8" bore or greater may punch through thin armor (1" or less) with minimum effect (see *Punch-Through Hits* on page 94), and AP shells are much more likely to punch through thin armor as HE shells. Guns below 5.9" bore carry common ammunition, which falls between AP and HE for penetration and damage effects.

All nationalities suffer from dud ammunition. If playing with the optional National Characteristics, German ships are three times more likely to have duds.

Division Targeting Mode

When commanding several divisions of ships, it is often easier to issue firing orders by division than by individual ship. There are four targeting modes for divisions: Battleline Mode, Range Mode, Threat Mode, and Hold Fire. These modes are available for main and secondary guns. Your ships will not fire until you select a mode other than Hold Fire. After choosing a firing mode, the program selects the principal target for each ship in the division. It also selects a second target for the turrets of the ship's battery if they are unable to engage the principal target because it is outside their arc of fire. For example, if the ship's starboard secondary guns have selected an enemy ship in their arc as the principal target, the port secondary guns will also fire at an enemy ship in their arc if one is present.

Battleline Mode: Battleline mode is a quick way to spread your ships' gunfire. The division coordinates its fire to engage the maximum number of targets at the minimum aggregate range (the program calculates all the possible combination of ranges from shooting ships to target ships and uses the smallest total). Each ship fires at its target until the target becomes invalid (for example, contact is lost or it sinks). When this occurs, the ship switches its fire to the closest unengaged target or to the closest target if all are engaged. Targets are re-evaluated each time you click on Battleline.

Range Mode: Each ship in the division fires at the target closest to it. Targets are re-evaluated every 10 seconds, but a ship will not switch fire until a new target is more than 10% closer than the current one.

Threat Mode: Each ship in the division fires at the target that poses the greatest threat to it. Targets are re-evaluated every 10 seconds, but the ship will not switch fire unless it perceives a new target to be more than a 25% greater threat. The base threat values are given below. Range is then factored in (closer range means more threat), as is the torpedo-launch capability of the target, which also increases the threat level.

Target Threat Table

	FIRING SHIP		
TARGET	BB/BC	CA/CL	DD
BB	80	40	50
BC	65	40	50
CA	30	40	50
CL	25	50	60
DD	20	60	70
TR	1	1	1

Salvo Fire and Reloading

When you select a target for your ship, the guns must train on the target before they fire. In most cases, the turrets must rotate to the correct bearing while the gun barrels elevate to achieve an arc that will place the shot where fire control calculates the target will be (allowing for the flight time of the shells). Each gun type is rated for the number of horizontal degrees per second its turrets rotate and the vertical degrees per second its barrels elevate. Heavier guns typically take longer to train than lighter guns.

A battery of guns fires in salvo, which allows the shells to fall in a group. After firing, the guns must reload. Each gun type has a base reload time, which is its highest rate-of-fire under ideal practice conditions (see the Gun Data Table on page 123). Reload time is increased by 20% across the board to account for the stress of battle. Crew quality, crew fatigue, and sea state also affect reload time, so that only an elite, fresh crew in good weather will achieve the book rate-of-fire. The smaller the vessel, the more the sea state affects its reload time.

If the fall of shot is over or short of the target, the time delay before the next salvo is 1.5x the shell flight time to target or 1.5x the reload time, whichever is longer. This policy conserves ammunition while fire control adjusts its calculation. As soon as a salvo straddles the target, the rate of fire immediately increases until it reaches the maximum allowable given the reload time under those crew and sea state conditions.

Changing targets causes a delay in being able to fire. Your guns will not fire at the new target until they train on it or until twice the reload time has passed (modified by crew quality and crew fatigue), whichever is longer.

Blocked Line of Fire

A ship will not fire at its target if the line of fire between firing ship and target ship is blocked by another ship. An intervening ship (friendly or enemy) that is within 1,000 yards of the firing ship will block the line of fire. Similarly, an intervening friendly ship (but not enemy) that is within 1,000 yards of the target ship will block line of fire.

Gunnery Modifiers

Range to target as a percentage of the gun's maximum range is the base factor in determining a firing ship's chance to hit. This hit chance is then affected by several other factors, which are itemized below as firing ship and target ship modifiers. These modifiers are percentage increases (positive) or percentage decreases (negative) of the chance to hit. Their effects are cumulative, but the total modifier applied to the base chance to hit may never be worse than –80%. For example, if the base chance to hit with a particular gun at a given range is 5%, and the total gunnery modifier to that percentage is –80%, then the modified chance to hit is 1% (80% of 5 is 4, and 5 – 4 = 1).

Firing Ship Gunnery Modifiers

Ship Type: Larger ships make steadier gun platforms. BB +20, BC +15, CA +0, CL –5, DD –10.

Secondary Guns: A ship's main guns were equipped with the best fire control, and its secondary guns were poorly equipped by comparison. Therefore, secondary guns receive a –40 modifier.

Main Fire Control: Main guns have two Directors. When the first is knocked out, the main guns suffer a –10 penalty. If both directors are knocked out, the main guns suffer a –50 penalty. There is no additional penalty if the ship is firing at more than one target.

Nationality: KM +20; USN, RN, and IJN 0. Kriegsmarine ships had superior optics for rangefinding and often straddled their targets after a few salvos. This modifier only applies when the National Characteristics preference is used.

Crew Quality: Elite +20, veteran +10, average +0, green –20.

Crew Fatigue: Fresh +0, normal –10, tired –20, fatigued –40.

Salvo Count: A battery's initial salvos at a new target tend to be off and require adjustment by fire control. Therefore, the first salvo at a target suffers a –25 penalty, and the second suffers a –10 penalty. Subsequent salvos at the same target are unaffected. Main and secondary guns operate on separate counts.

Visibility at Night: Firing at night is always less effective than firing during the day. The nighttime gunnery modifier varies from -10 (best) to –80 (worst) depending on illumination by starshells, searchlights, recognition lights, gun flashes, and fires on board the target ship.

Radar: The base value for the radar modifier depends on the radar's quality: good +20, average +10, poor +0. However, rain and higher sea states will reduce these radar gunnery benefits (but never below +0).

Night Fighting: Not all ships had similar training or equipment suitable for nighttime operations. In particular, IJN ships had significant advantages with specialized optical equipment and training techniques that made them much more effective in nighttime battles. Crews with little nighttime training were often confused when firing at targets in the dark. Night fighting modifiers apply from sunset to sunrise: expert +20, good +10, average +0, poor –20.

Evasive Maneuvering: -20 (ignored if firing ship turning).

Turning: If the firing ship is turning, its gunfire is modified by –10. If it is an emergency turn, the modifier is –20. If the ship is doing evasive maneuvers when it turns, the turning effect overrides the evasive maneuvering effect. When the turn is completed, the evasive maneuvering effect resumes.

Sea State: Using the Beaufort Scale of sea state, there is no effect for sea states 0 or 1. Sea state 2 = -20, sea state 3 and 4 = -30, 5 = -40, 6 = -50, and 7 and 8 = -60. DDs take the full impact of the sea. CLs and CAs receive a +5 modifier, and BCs and BBs receive a +10 modifier (these bonuses do not apply for sea states 0 and 1).

Target Ship Gunnery Modifiers

Size: The smaller the target (length times beam), the harder it is to hit.

Evasive Maneuvering: –30 (ignored if target turning).

Multiple Firing Ships: When multiple ships fire at the same target at great distances, it is often difficult for fire control spotters to pick out their own ship's salvo splashes from the others. Gunfire is therefore modified by -10 for 2 ships, -15 for 3 ships, -20 for 4 ships, and -25 for 5 or more ships firing on the same target. Larger shells create larger waterspouts, which helps in identifying salvos from different-sized guns. Therefore, guns below 5.9" bore (which fire common ammunition) only interfere with other guns of that size; guns of 11"-bore or greater only interfere with other heavy guns; and medium guns (5.9" to under 11") only interfere with other medium guns. This modifier does not affect a ship firing within 40% of its guns' maximum range.

Aspect: A target steaming directly toward or away from you is more difficult to hit than one that is broadside.

Speed: The faster the target, the harder it is to hit. The midpoint of the scale is 15 knots (0 modifier), with targets steaming above that speed generating a negative modifier; and those steaming below that speed generating a positive modifier. On this scale, a dead-in-the-water target is +10, and a 30-knot target is –10.

Turning: -20 if target currently turning. If the target is doing evasive maneuvers when it turns, the turning effect overrides the target's evasive maneuvering effect. When the turn is completed, the evasive maneuvering effect resumes.

Information Level Effect

After applying the above gunnery modifiers, the chance to hit is then modified according to the information level available about that target from the firing ship (see *Target Information Level* on page 82). If the target is only a Contact, the chance to hit is reduced 50%. If the firing ship has identified the target's Type (but not its Name), the chance to hit is reduced 25%. A ship may not fire at a radar-only contact.

Number of Guns Firing

The number of guns firing in a salvo affects the chance to hit. More is better. When possible, you should maneuver your ship to bring as many guns of a given battery to bear on the target to increase the chance of hitting.

Torpedoes

Torpedoes posed the single greatest danger to ships in WWII, whether launched by submarines, aircraft, or warships. Torpedoes struck their targets where it hurt the most – below the waterline. For passive defense against torpedoes, capital ships were fitted with exterior bulges to their hulls as well as interior armored anti-torpedo bulkheads to limit the damage caused by a torpedo's warhead. The hull spaces of the ships were also divided into many small compartments (instead of fewer large ones) to limit the flooding caused by an underwater hit. For active defense, capital ships carried rapid-fire secondary (and sometimes tertiary) guns designed to engage the enemy's fast, torpedo-carrying craft (such as destroyers) before they closed to launching range.

Types

Each navy carries its own types of torpedoes. See the Torpedo Data Table on page 123. Torpedoes are identified by their diameter in inches, and they are rated for weight of explosive charge, maximum range, and speed. Most torpedo types have two or three range settings based on speed. A higher-speed setting drains the torpedo's power supply faster, which restricts its range, but a fast torpedo will reach the target sooner and thus limit the time that the target has to detect and avoid it (although torpedoes travel beneath the sea's surface, they leave detectable wakes). When a torpedo reaches the end of its run, it no longer poses a threat. Similarly, a torpedo is not primed for the first 1,000 yards of its run and does not pose a threat until after then.

Launch

Most torpedoes in FIGHTING STEEL are carried on deck swivel-mounts placed in centerline positions that can fire to either broadside. The starboard arc of fire is 30-150 degrees (0 degrees being the heading of the ship), and the port arc of fire is 210-330 degrees. In the case of larger ships, the mounts are placed in wing positions that can only fire to one side. Each mount carries two to five torpedoes. For game purposes, these are fired together (you may not fire individual torpedoes from a given mount). Some ships carried reloads, but reloading was a dangerous procedure at sea, not to be undertaken in the midst of battle.

When you select a target for your torpedoes, the program calculates where the torpedoes will intercept the target if it maintains its current speed and heading. The program automatically chooses the torpedo range/speed setting that will reach the interception point at the fastest speed. This interception point marks the center of your spread. The

launch angles of the torpedoes are then automatically set so that the distance between them at the expected interception point equals the length of the target ship. The length of the target ship is known if the information level is either Type or Name level (if the target is only at Contact level, its length is assumed to be 500 feet). Selecting a narrow spread reduces the distance to 50% of the target's length; selecting a wide spread increases it to 200%. A narrow spread increases the chances of multiple hits on the target, but a wide spread is useful if you expect the target to alter course or speed after launch. All mounts fired at the same time are included in a single spread.

Attack

Several factors are evaluated at the time of torpedo launch to tell you how good a shot you are taking. The program gives you an estimation of the chance to hit assuming the target maintains its current speed and course based on the information that the torpedo-mount crew has about the target. The less reliable the information, the greater the chance that the crew chooses an inaccurate interception point. For the most effective chance of a hit, you want the run-time (in seconds) to the target to be as short as possible. Therefore, you should try to close the range and choose a fast-speed setting to your torpedoes. A target that is dead-in-the-water is a sitting duck, whereas a target destroyer steaming over 30 knots is going to be much harder to hit.

One of the most important factors is the information level that the firing ship has on the target at launch: the chance of hitting a Contact target is reduced by 50%, and the chance of hitting a Type target is reduced by 25%. This reduction is applied even if the information level changes before the torpedo reaches its target or if some other ship beside the original target is struck by the spread.

WWII torpedoes are dumb weapons that hit anything that gets in their way, whether friend or foe. Therefore, any ship that meets a moving torpedo spread checks to see if it hits. The chance of hitting depends on the information level at launch and the ship's aspect to the attack (how much of its length it presents to the torpedo spread). The greatest probability occurs when the target is perpendicular to the path of the torpedo spread; the least probability occurs when the target is parallel to its path (the ship is bow- or stern-on to the torpedo).

The chance of hitting also depends on the width of the torpedo spread. A narrow spread of torpedoes covers a narrower field but has a greater chance of hits when it encounters a ship. A wide spread covers a wider field but has less chance of hits when it encounters a ship. Finally, the torpedo must pass a dud test if you turned on the Torpedo Duds preference or National Characteristics preference.

The effects of torpedo damage are covered in the *Torpedo Damage* section – see page 97.

Dud Rate

Even though a torpedo successfully hits, there is a chance that it was set too deep, exploded prematurely, or otherwise malfunctioned. If a torpedo is determined to be a dud, it inflicts no damage and ends its run at that point.

Selecting the Torpedo Duds Possible preference sets the dud rate at 20% for each nation. However, if you select the National Characteristics preference, each nation is given its own dud rate. Through the period covered in this game (1939-1942), US torpedoes were notoriously ineffective. Therefore, the USN's dud rate is 80%. The IJN had

the best torpedoes, so its dud rate is only 10%. The RN's dud rate is 20%. The Kriegsmarine experienced serious problems with its torpedoes at the start of the war, but it made improvements year by year. Its rate of duds is 60% in 1939, 50% in 1940, 40% in 1941, and 30% in 1942.

Damage System

Every successful hit on a target causes some damage. A shell causes an amount of damage based directly on its weight. For example, a US 16" AP shell that penetrates the target's armor inflicts 2,700 damage points. Torpedoes inflict damage based on their warhead weights (see *Torpedo Damage* on page 97 for more about how torpedo damage is calculated). Damage accumulates as Hit Points (structural damage) or Flotation Points (flotation damage). Hits can also start fires, and ship systems can be critically affected or destroyed. Enough damage – or perhaps a catastrophic hit – will cause the ship to sink.

Hit Points

Each ship has a hit point value, which represents how much structural damage it can take before it is put out of action. A ship's hit point value is based on its full-load displacement. Thus, the *Yamato*, which has a full-load displacement of 69,990 tons, requires 69,990 hit points to knock it out of action. A ship's close-in weapon system is reduced by a direct percentage of its hit point damage, and its reload time for all guns is increased by a direct percentage of its hit point damage. A ship that is out of action (100% hit point damage) cannot operate any of its systems or perform any actions. If it was moving, it decelerates to zero knots and becomes dead in the water. Any hit point damage beyond 100% is converted instead to flotation point damage at a 2:1 ratio. An out-of-action ship does not sink until its flotation point damage reaches 100%.

Flotation Points

Each ship has a flotation point value, which represents how much flooding it can take before sinking. A ship's flotation point value equals one half of its hit point value. For example, the *Yamato* can take 34,995 flotation points of damage before sinking. A ship's maximum speed is reduced by a percentage equal to one half of its flotation point damage percentage. For example, if the ship has suffered 20% flotation point damage, its maximum speed is reduced 10%. In addition, at the 26% flotation damage threshold, the ship's turn rate is reduced one level, and its acceleration and deceleration rates are reduced by one level. It suffers these same reductions again at the 50% and 75% damage thresholds. At 100% flotation point damage, the ship starts to sink.

Shell Hit Location

When a ship is straddled and hit, its range and aspect to the firing ship determine the location of the hits. The range to the target is compared to the firing weapon's maximum range to determine whether the hit is direct (strikes the ship from a low angle) or plunging (strikes the ship from a high angle). At close ranges, hits tend to be direct, and at long ranges they tend to be plunging. For example, if the target is at 20% or less of the gun's maximum range, all of the hits are direct. At 60% of the gun's range, it's an almost even split between direct and plunging fire, and at 75% of the gun's range or greater, all hits are plunging.

A shell can hit the target's hull, weapon system, superstructure, or deck.

Hit Location Probability Table

	TYPE OF FIRE	
HIT LOCATION	DIRECT	PLUNGING
Hull	40%	10%
Weapon	15%	20%
Structure	45%	30%
Deck	0%	40%
TOTAL	100%	100%

Armor Penetration

Hits that penetrate a ship's armor before exploding cause more damage than those that explode on the armor's face. Every shell has a penetration value based on the armor thickness (in inches) it can penetrate at a range of zero yards. The range to the target is compared to the firing weapon's maximum range to determine its penetration value at impact. Overall, direct fire has greater penetrating power than plunging fire because the shell in the latter case has lost much of its velocity. However, direct fire strikes the target's vertical armor whereas plunging fire strikes the horizontal armor, which is generally thinner. Plunging fire at close ranges (for example, at 25% of the gun's maximum range) is less effective because it strikes the target's armor at a shallow angle and tends to ricochet off rather than penetrate the armor.

Penetration and Damage

Against the same thickness of armor, an HE shell has 40% of the penetrating power of an AP shell of the same weight. A common shell of the same weight has 60% of the penetrating power. The shell's weight, and whether it penetrates or not, determines the amount of damage. Non-penetrating hits do significantly less damage:

Damage Multiplier Table

	TYPE OF HIT	
SHELL TYPE	PENETRATING	NON-PENETRATING
AP	100%	10%
HE	200%	20%
Common	130%	5%

Punch-Through Hits

There is such a thing as too much penetration. When a ship's armor is thin, heavy shells tend to punch through *both* sides of the ship before exploding, so most of their explosive effect is wasted. In FIGHTING STEEL, a punch-through hit can occur if the armor is 1" or less and the firing gun size is 8" or greater. The heaviest shells (such as those fired by battleships) are most likely to punch through, and AP shells are much more likely to punch through as HE shells. If a hit punches through, it causes only 5% of its normal damage and does not harm the ship's systems.

Hull Hits

A shell hit on the hull must check against the target's armor belt value to determine if it penetrates. Whether the hit penetrates or not, a percentage of the damage inflicted counts as flotation point damage and the remaining percentage counts as hit point damage according to the following schedule:

Application of Hull Hit Damage

	TARGET TYPE				
WHERE APPLIED	BB	BC	CA	CL	DD/TR
Flotation Point	50%	60%	80%	90%	100%
Hit Point	50%	40%	20%	10%	0%
TOTAL	100%	100%	100%	100%	100%

If the shot penetrates, there is also a 20% chance it will affect one of the ship's systems or a 10% chance it will affect two systems (70% chance that it affects none). The possible systems it can harm are Damage Control, Flotation Point, Hit Point, Magazine, Maneuver, Power, and Propulsion. See *System Damage* on page 92??.

Weapon Hits

If the shell hits the weapon system, the program determines which weapon type is hit: main gun turret, secondary gun turret, tertiary gun turret, or torpedo mount. If the ship does not have a given weapon type (for example, the ship does not carry tertiary guns), then the hit goes against a main gun turret. Any damage inflicted (whether penetrating or not) counts as hit point damage. A penetrating hit also destroys the turret or mount.

A hit against the main guns checks against the main turret armor to determine if it penetrates. If the fire was plunging, it checks against half of this armor value. A hit to secondary guns checks against the secondary turret armor (half this armor value if plunging), and hits to tertiary guns and torpedo mounts automatically penetrate.

The aspect of the target may limit which guns are hit by direct fire. For direct-fire hits to main guns, only those turrets whose arcs of fire take in the firing ship may be hit. Thus, if the target's bow faces your firing ship, only its forward turrets could be hit, and if its stern faces your firing ship, only its aft turrets could be hit by direct fire. Similarly, direct hits to secondary and tertiary turrets can only affect the turrets on the side of the target facing the firing ship. Plunging fire is not restricted in this manner.

A destroyed turret can be hit again, and such a hit causes hit point damage, but it does not affect other, undestroyed turrets.

In addition to turret destruction and hit point damage, there is a 2% chance that a penetrating weapon hit will destroy a main magazine. If a main magazine is destroyed, the ship has a 50% chance of immediately sinking due to a catastrophic explosion. Otherwise, the magazine is flooded and can no longer service the turrets linked to it.

Superstructure Hits

A shell hit on the superstructure must check against the target's superstructure armor value to determine if it penetrates. Any damage inflicted (whether penetrating or not) counts as hit point damage. There is also a 15% chance that the hit will affect one of the ship's systems or a 5% chance it will affect two systems. A penetrating hit can affect the Bridge, Director, or Radar system (a penetrating hit that affects the Bridge checks against the conning tower armor). A non-penetrating hit can affect the Radar or Searchlight system.

Deck Hits

A shell hit on the deck must check against the target's deck armor value to determine if it penetrates. Any damage inflicted (whether penetrating or not) counts half as flotation point damage and half as hit point damage. If the shell penetrates, there is also a 30% chance it will affect one system or a 10% chance it will affect two systems. The systems that can be affected are Damage Control, Flotation Point, Hit Point, Magazine, Maneuver, Power, and Propulsion.

Damage to Ship Systems

Damage to systems represents critical damage on top of hit point and flotation point damage. Any hit on a system may damage or destroy that system. Most systems are unusable while damaged, but Damage Control can repair a damaged system. Repair time is randomly determined and may take anywhere from two minutes to an hour. Crew quality and fatigue affects how fast the repairs are made. A destroyed system is not repairable during the time span of a battle.

Bridge System: Penetrating shell hits to the superstructure may damage (but never destroy) the ship's Bridge. A shell striking the Bridge must penetrate the conning tower armor to damage it. When the Bridge is damaged, initial Contact reports are delayed by 25 seconds. If the ship's Power system is damaged, the Bridge is off line and suffers the same penalty as if it were damaged.

Damage Control System: Penetrating shell hits to the hull or deck may damage (but never destroy) the Damage Control system. If Damage Control is damaged, all repair times are doubled and it is harder to put out fires. When using the National Characteristics preference, USN repair times are reduced by 30% and IJN repair times are increased by 30%.

Director System: Shell hits to the superstructure may damage or destroy the Director system. A ship has two directors for its main guns. When the first is knocked out, the main guns suffer a –10% modifier to their chance to hit. If both directors are knocked out, the main guns suffer a –50% modifier.

Flotation Point System: Torpedo hits or penetrating shell hits to the hull or deck may cause critical damage to the flotation point system. Such damage represents collapsed bulkheads. It is treated as extra flotation point damage and is not repairable.

Hit Point System: Penetrating shell hits to the hull or deck may cause critical damage to the hit point system. Such damage is treated as extra hit point damage and is not repairable.

Magazine System: Each ship has two main gun magazines, and each main turret is linked to one of those magazines. Because of its potentially explosive nature, a magazine is either operating or destroyed – there is no damaged state for magazines. A penetrating shell hit to the hull, deck, or weapons may destroy a magazine. If the magazine is struck, there is a 50% chance it will be flooded by the crew to save the ship, and there is a 50% chance it will cause a massive explosion that tears the ship apart. A flooded magazine no longer supplies ammunition to the main guns linked to it.

Maneuver System: Torpedo hits or penetrating shell hits to the hull or deck may damage or destroy the Maneuver system (steering and rudder gear). If damaged, the rudder is jammed to port, starboard, or centerline so that the ship must move in that direction until the damage is repaired. If destroyed, the ship uses the worst turning rate, which is a 1,600-yard diameter.

Power System: Torpedo hits or penetrating shell hits to the hull or deck may damage (but never destroy) the Power system (electrics). A damaged Power system goes off line until repaired. While off line, some other systems that require power are also off line: Weapons, Searchlights, Radar, and Bridge.

Propulsion System: Torpedo hits or penetrating shell hits to the hull or deck may damage and eventually destroy the Propulsion system (engines). Every hit to Propulsion permanently reduces the ship's maximum speed by 5 to 20% (Damage Control cannot repair this permanent damage). Propulsion is destroyed (and the ship slows to a halt) when the engine level reaches 0%. A hit to Propulsion may also disable the engines temporarily, forcing the ship to decelerate until Damage Control repairs it.

Radar System: Shell hits to the superstructure (both penetrating and non-penetrating) may damage or destroy the Radar system. If the Power system is damaged, Radar is off line until Power is repaired. A damaged, off-line, or destroyed Radar system does not permit radar detection or provide a gunnery modifier.

Searchlight System: Non-penetrating shell hits to the superstructure may destroy searchlights (they are relatively fragile instruments in exposed positions). The Searchlight system is also linked to the Power system, so if the Power system is damaged, searchlights may not be used until it is repaired. BBs and BCs have four searchlight positions that can be destroyed (two on the port side and two on the starboard side); all other ships have two searchlight positions (one on each side).

Weapon System: Hits to the different parts of the Weapon system (main, secondary, and tertiary guns, close-in weapons, and torpedo mounts) are covered in *Weapon Hits* on page 94. The Weapon system is also dependent on the Power system. If the Power system is damaged, all weapons are off line until it is repaired. Main guns also require a functioning Magazine system.

Fire Points

Each shell that hits a target can start a fire. Shells that penetrate the hull or deck have a 10% chance of starting a fire. Shells that penetrate the weapons system have a 20% chance, and shells that penetrate the superstructure have a 5% chance. Non-penetrating hits have only a 1% chance of starting a fire.

The program keeps track of the total number of fires on the ship. The number of fires can grow on its own (for example, growing from one to two fires) or shrink (for example, falling from one to zero). The higher the total number of fires, the greater the chance that the total number will grow instead of shrink, and the more damage the fire will do. Crew quality and fatigue affects the chance of fires shrinking. If the National Characteristics preference is selected, the chance of fires shrinking on USN ships is doubled but the chance is halved on IJN ships.

Fires inflict hit point damage on the ship every minute. There is also a small chance every minute that the fires will trigger an explosion. A fire-induced explosion causes additional damage that is about the equivalent of an 8" penetrating hit.

At the end of the battle, the program increases Damage Control to 200% of its current level (crewmen are taken off the guns to fight fires and make repairs) and then determines if the fires eventually sink the ship or are put out. This has an impact on final victory.

Torpedo Damage

Torpedoes inflict flotation point damage. The extent of damage is based on the torpedo's warhead weight and is multiplied by a random factor. Torpedoes with larger warheads tend to do exponentially greater damage. However, the target ship's torpedo defense value may reduce or entirely cancel the damage.

Each ship in FIGHTING STEEL has a torpedo defense value ranging from 0 to 3. A value of 0 means it has no special defense against underwater damage. If the target has a value of 1, it cancels the torpedo hit 10% of the time or, if that fails, it reduces the torpedo damage by 20%. A rating of 2 cancels the hit 20% of the time or reduces the damage by 30%, and a rating of 3 cancels the hit 40% of the time or reduces the damage by 40%. However, each torpedo that hits has a 20% chance of reducing the target's torpedo defense value by one level.

Besides flotation point damage, a torpedo hit has a 30% chance of affecting one ship system, 5% of affecting two, 4% of affecting three, and 1% chance of affecting four systems (60% chance that it affects none). The systems that can be affected are Maneuver, Power, Propulsion, and Flotation Point.

Collision Damage

When two ships collide, both suffer flotation point damage. The amount of damage is based on the angle of collision, relative speed, and the size of the other ship. If the angle of collision is below 5 degrees, the two ships graze one another but cause no damage. If the angle is between 5 and 15 degrees, each ship suffers flotation point damage equal to 1% of the other ship's displacement size. Between 15 and 30 degrees, each suffers damage equal to 5% of the other's displacement; between 30 and 60 degrees, each suffers damage equal to 15% of the other's displacement; and between 60 and 90 degrees, each suffers damage equal to 30% of the other ship's displacement.

These damage percentages assume a 30-knot relative speed of collision. If the relative speed is less (as when both ships are steaming in nearly the same direction), the flotation point damage is similarly less; if the relative speed is more (as when both ships are steaming in nearly opposite directions at fast speed), the damage is similarly more. For example, a 60-knot collision does twice the percentage damage listed above.

After Battle Damage

Ships of one or both sides may suffer additional damage at the end of the battle (before victory is determined) due to the effects of existing fires or Air/Sea Control. The scenario's Air/Sea Control is listed in the Briefing screen ([F6]). Air/Sea Control represents the effects of submarine attacks and air strikes made after the battle to pick off surviving (and often damaged) ships. If one force has Air/Sea Control, the other side's ships automatically check for additional damage. If Air/Sea Control is contested, both forces' ships automatically check.

For each ship that checks, the program picks a random number from 0-100. If the result is less than 40, the ship is attacked and suffers 30-80% hit point damage and 30-80% flotation point damage. The random number is modified by +20 if Air/Sea Control is contested. The current maximum speed of the ship also modifies the check number (the ship's Damage Control has an opportunity to repair a disabled Propulsion system after the battle, which would improve the ship's speed). However, escorts on convoy missions do not receive any positive modifier for speed (they are tied to the convoy, which makes them more vulnerable to air and submarine attacks).

Ship Speed Modifier to Air/Sea Control Check

CURRENT MAX. SPEED	MODIFIER
>= 30 knots	+40
>= 25 knots	+20
>= 20 knots	+10
>= 15 knots	+0
>= 10 knots	-20
>= 1 knot	-40
dead in the water	-60

■ STAFF BRIEFING

Notes on Tactics

Check the Environment

When you first start a battle, check the environment on the Briefing Screen. Pay close attention to whether this is a day or night battle, what the visibility and radar conditions are, and check the sea state. Remember that at high sea state levels the smaller ships will not be able to keep up with the larger ships and their gunnery will suffer greater penalties as well. Also, you will want to know what the initial visual detection range is. It is always a good idea to turn on the detection range circles on the 2D map so that you can get a sense of whether your radar will be able to see your opponent before you (or they) are likely to make visual contact.

Know Your Ships and Know Your Enemy

When beginning a battle, it is important that you know the strengths and weaknesses of your ships. First, make sure you know which of your ships have torpedoes, then decide on a range at which you think they would best be used. Japanese torpedoes can be the single most important factor in a battle as they have incredible range, seldom are defective, and they carry a very destructive warhead. If you are playing as the Japanese, especially at night, your main goal should be to fire off a barrage of torpedoes so wide and dense that the enemy will be unable to avoid them all. If you are playing as the USN and using the National Characteristics preference, you can almost forget torpedoes as an effective weapon. Focus instead on using your radar advantage to maneuver to cross the enemy's T (cross in front of the enemy's bow or stern), illuminating the enemy with starshells and searchlights once this position has been gained. Be careful to turn away from any likely torpedo attack. It is much better to sacrifice some gunnery in order to keep your ships from being hit broadside by a spread of Japanese torpedoes.

For the Germans, torpedoes are a possible option, especially later in the war, but you need to close to within 8,000 yards to consider using them. The British, with slower torpedoes need to come even closer to their intended victims before firing. During daylight battles, it is very important that you determine as quickly as possible which side has the more highly armored ships. If you can determine a range at which you can engage the enemy and penetrate his armor, while not being penetrated in return, this is the best place for you to go. Obviously, if you have the larger ships (BBs vs. CAs, or CAs vs. DDs), you should keep your distance and allow your bigger guns to destroy the enemy before they can reach you. Of course, if you don't sight and identify the enemy, it is awfully hard to determine a strategy.

Find the Enemy

Once the game begins, your first priority is to identify where the enemy is coming from and the composition of the enemy force. If it is a good visibility daylight battle, this is easy. If it is a night battle and you have good radar, this too can be easy, and in fact if you have radar superiority over your opponent, this can be a tremendous advantage if used properly. In daylight, keep your DDs out in front of your main force, and at night make sure that your best radar ships are near the front of the formation. Do not spread your forces too much at this point. If playing a multiplayer Division Commander game, try to determine where your allies' ships are, and try to join up with them so you can identify them as friendly before the fighting starts. If this is not possible, be wary of shooting at ships before you know that they are in fact the enemy. In any case, if you don't sight the enemy within a few minutes this is a bad sign. You are either being spotted by the enemy and possibly are being outmaneuvered, or you are away from the initial point of contact (this could mean your allies are fighting the enemy outnumbered). If playing multiplayer, chat with your allies to try to figure out as soon as possible who is engaged and who needs to find the battle. If you still can't find the enemy, then try to complete your mission as best you can.

Don't Forget Your Mission

Keep your mission in mind at all times. If you are escorting a convoy, find the best way to get the transports out of the battle (make smoke, scatter) while aggressively engaging the attackers. If evading, don't let yourself get caught in a slugfest. Try to get around your attackers and outrun them. Focus on disabling their faster ships if this will allow you to disengage many of your ships. Although it is likely you will always have to engage the enemy force in some way in order to complete your mission, it is important that you understand your overall objective. Be sure to take advantage of any opportunity your opponent gives you to complete your mission.

Stay Together

As is true in almost all military actions, concentration of force is one of the keys to victory in FIGHTING STEEL. Don't scatter your forces or engage the enemy piecemeal. Concentrate all of your fighting power on a portion of the enemy force if possible so that it can be destroyed in detail. If you outnumber your opponent with many smaller ships, swarm the enemy with all of your ships, firing barrages of torpedoes when you can. If you are outnumbered, hang back if possible and whittle down the enemy strength – don't let them get close enough to take advantage of their numbers.

Tactics

Torpedoes should always be your biggest fear (unless the opponent is a USN force with National Characteristics turned on).

Don't stay on the same course for too long or you will be inviting disaster from enemy torpedoes. If steaming in a long column, use intermittent simultaneous turns towards or away from the enemy to cut down on the amount of time your broadsides are presented as a torpedo target. A barrage of torpedoes fired at a long column that is moving perpendicular to the torpedoes will win most battles outright.

Don't waste ammo firing at ships until they are identified by Name (unless you are already very close to the enemy at night). Always hold your torpedoes until you have the enemy's ship name identified.

Whenever possible, maneuver to cross the enemy battleline's T. This will minimize return fire by the enemy and also make it difficult for them to fire torpedoes.

Determine what range is best for you to engage the enemy (based on torpedoes and gunnery penetration vs. armor) and try to stay at that range as long as possible.

Use evasive maneuvering, especially for DDs, whenever you think your gunnery will do less damage to the enemy than the expected return fire. DDs should always use evasive maneuvering unless they are trying to move quickly to close the range and fire torpedoes.

Use smoke liberally to protect transports and crippled ships.

Don't give away your positions by firing prematurely if you have a visibility advantage. Wait until you have all or most of your ships in position to engage the enemy and then illuminate the enemy with starshells. If you have a radar contact, be sure to pick targets for your ships before illuminating the enemy. Although your ships cannot fire at a radar target, they will train their turrets on the contacts, saving precious time when the enemy is visually spotted.

If playing with the Mistaken Maneuver realism preference, it is unwise to travel at speeds over 90% of your ships' maximum. Also, it is asking for trouble to order an emergency turn at night, especially when moving fast.

Background to Historical Scenarios

Atlantic Battles, 1939-1942
The surface forces are so inferior in numbers and power to those of the British fleet that, even at full strength, they can do no more than show that they know how to die gallantly. — Grand Admiral Erich Raeder, C-in-C of the Kriegsmarine, September 3, 1939

Close the range; get closer, get close – I can't see enough hits.— Admiral Sir John Tovey to the captain of *King George* while engaging *Bismarck*, May 27, 1941

When Germany invaded Poland in 1939, she was woefully unprepared to fight a major naval war with Great Britain. German naval rearmament was on a schedule that called for war to begin in 1946, and in 1939, the German Navy consisted of no more than a handful of battlecruisers, cruisers and destroyers. The might of the Royal Navy, arguably the greatest naval power on earth, stood between the Kriegsmarine and the open waters of the Atlantic. Given the impossible odds, German strategy became one of attempting to interrupt British merchant shipping through the use of raiders that sortied independently. Evading the blockading British forces and working in conjunction with supply ships that hid in the vast space of the Atlantic, these raiders preyed on lone merchant ships, or occasionally gorged themselves on weakly escorted convoys. A full fleet commitment was made during the invasion of Norway in April 1940, but heavy losses forced the Kriegsmarine to revert to its prior strategy, which it continued to pursue into 1943.

Battle of the River Plate, December 13, 1939
When war with Britain commenced in early September 1939, the German "pocket battleship" *Admiral Graf Spee* was already at sea in the Atlantic. Her mission was to harass the merchant shipping of Great Britain and France, and she set course for the South Atlantic. The Germans hoped this action would draw valuable British ships away from the North Atlantic theatre where they were already spread too thinly.

Graf Spee enjoyed success for over three months, sinking nine merchant ships in the South Atlantic and Indian Oceans. Not until the middle of December did the Royal Navy get the opportunity to engage her. The *Graf Spee* had been ordered to return to home waters for an engine overhaul, but her captain, Hans Langsdorff, headed first for the River Plate shipping lanes off the coast of South America, where he intended to acquire a few more victories before his return home. On December 2, *Graf Spee* sank the liner *Doric Star*, then on December 6 the SS *Tairoa*. Both ships sent out distress calls, thereby alerting the Royal Navy that the German raider was in the area.

On December 9, the British cruisers *Exeter, Achilles* and *Ajax* under the command of Commodore Henry Harwood were ordered to proceed to a patrol zone 150 miles east of the River Plate estuary. They arrived on the 12th, before the *Graf Spee*.

At 06.14 on the 13th, the British sighted *Graf Spee*. The three British ships deployed into two divisions – the 6"-gunned cruisers *Achilles* and *Ajax* in one division, and *Exeter* with 8" guns in the other. The cruisers had an 8 knot speed advantage over *Graf Spee*, whose speed was reduced to 24 knots due to a fouled hull.

The *Graf Spee* began firing at 06.22, with *Exeter* responding first, followed by *Achilles*, then *Ajax*. *Exeter* was hit several times. One salvo damaged her Walrus aircraft while another hit B turret. Splinter damage from both of these hits killed a number of crewmen. The *Graf Spee* did not go in for the kill but began firing on *Ajax* and *Achilles*. They received only splinter damage, while the damaged *Exeter* fired torpedoes at the German ship. *Graf Spee* had been hit several times, and with the threat of enemy torpedoes she turned sharply to port in an evasive maneuver. German fire fell again on *Exeter*, and hits took out A turret, caused a fire, and a 7-degree list. Despite this serious damage, neither the *Exeter*'s engines nor speed were affected. Again, however, instead of pursuing the *Exeter* to totally put her out of action, *Graf Spee* turned her attention back to *Ajax* and *Achilles*. With the range closing to 17,000 yards, *Graf Spee* fired on the two cruisers. A chase followed until *Ajax* closed to 11,000 yards and hit the *Graf Spee* amidships. Fire from *Graf Spee* destroyed *Ajax*'s two afterturrets. *Ajax* fired torpedoes, then *Graf Spee* fired torpedoes, but none of these hit.

Graf Spee had suffered damage to her superstructure, bow, oil purification and water and refrigeration plants. Langsdorff decided to head for the neutral port of Montevideo. The damaged *Exeter* was ordered to head for the Falklands. *Ajax* and *Achilles* followed *Graf Spee*, splitting up as they approached the River Plate, with *Ajax* going to the south of the river's mouth. *Graf Spee* reached the river before midnight, after firing a few final salvos at the shadowing cruisers.

The arrival of the *Graf Spee* in Montevideo began a series of political wrangles over whether or not she should be allowed to stay in port. Finally the Uruguayan government decided she should leave on December 17. British reinforcements were on their way, and Langsdorff was left with the choice of trying to reach Argentina, where he

might expect more support, or of scuttling his ship. He decided to scuttle his ship. *Graf Spee* was taken out into the estuary as crowds gathered on the shoreline, and she was ripped apart by demolition charges at 22.00.

Langsdorff took full responsibility for the fate of *Graf Spee* and shot himself in what he felt was the only honorable end to his career.

Invasion of Norway, April 1940

The Norwegian port of Narvik was important for the German war effort as an ice-free winter port where iron ore from Sweden could be loaded on ships bound for Germany. The British of course wanted to prevent these supplies from reaching Germany and made several plans that included mine-laying operations in the fjords and occupation of certain key Norwegian ports. As it turned out, the British did not get the chance to put any of these plans into operation before the Germans, with their own planned operation, *Weserubung*, invaded the coast of Norway, taking Bergen, Oslo, Kristiansand and Arendal, Stavanger, Baroy Island, and Trondheim. Narvik fell at 08.00 on 9 April 1940.

Due to the mismanagement of information, and a belief on the part of the British Admiralty that the German invasion would not take place, British ships were not in the best positions to intercept the invasion fleets. The British intercept ships were redeployed after the destroyer *Glowworm,* which had left her formation to search for a man overboard, encountered German destroyers and the *Admiral Hipper.* Despite the odds against her, and keen to damage the enemy, *Glowworm* rammed *Hipper* and was sunk. While some British ships were sent to assist *Glowworm,* the battlecruiser *Renown* was ordered towards Vestfjord to intercept any enemy ships heading that way.

At 03.37 on April 9, in a mixture of snow and rainstorms, gale force winds and high seas, the *Renown,* with ships of the 2nd Flotilla of destroyers, met the battlecruisers *Gneisenau* and *Scharnhorst.* The German ships were heading north, about fifty miles off the coast of Vestfjord. *Renown's* 15" guns belched fire as she closed to 15,000 yards. At 04.17, *Renown* scored a hit on *Gneisenau,* which put out the main gunnery control system. The battle now became a chase as the German ships fled the scene. Despite only being able to use her forward turrets, and in very heavy weather, *Renown* managed to hit the *Gneisenau* twice more before losing her and *Scharnhorst* in snow squalls. One of these hits took out a forward turret.

For the British this was a small victory in a botched operation that allowed the Germans to take Norway's ports.

Pursuit of the Bismarck, May 1941

In May 1941, the German cruiser *Prinz Eugen* and newly commissioned battleship *Bismarck* went to sea with orders to break out into the Atlantic and attack British convoys. They left the port of Gdynia in German-occupied Poland, steamed through the Skagerrak between Denmark and Norway (both German occupied) and headed for the

Denmark Straits, a gap between the ice floes of Greenland and the coast of Iceland. Vice Admiral Gunther Lutjens, considered by some to be the Kriegsmarine's best fighting admiral, commanded the two ships. The battlecruisers *Gneisenau* and *Scharnhorst* were originally scheduled to participate in the operation, code-named *Rheinubung* (Rhine Exercise), but they were both undergoing repairs in the harbor of Brest, France.

British forces were quickly sent out to intercept *Bismarck,* and on May 23 the 8"-gun cruisers *Suffolk* and *Norfolk* sighted the pair of German ships. The British cruisers followed *Bismarck* at a safe distance and waited for reinforcement. Meanwhile, *Prinz Eugen* moved to the front of the line to give *Bismarck* a clear arc of fire astern. Weather conditions were appalling, and the British cruisers lost contact with the German ships around midnight during a snowstorm. Radar contact was regained about three hours later.

At 05.37 on the 24th, the British battleship *Prince of Wales* sighted the German force. The flagship *Hood,* a British battlecruiser launched during WWI, opened fire at 05.52. Both ships were under the command of Vice Admiral L.E. Holland. In a poor firing position, *Hood* could only bring her forward guns to bear, while the German ships fired broadsides. *Prinz Eugen* was firing high-explosive ammunition and started a huge blaze on board *Hood.* This gave *Bismarck* the chance to adjust her range finders. At 06.00 an explosion ripped *Hood* in half and she sank. Only three survivors were rescued from a crew of 1,418. The *Prince of Wales* broke off action at 06.13, after receiving seven hits.

Bismarck also was damaged in the fight. Leaking oil, with 1,000 tons of fuel unavailable due to flooded pumping gear, and two boilers out of action, she was forced to slow to 28 knots. With the British in pursuit, the pair of German ships headed south. That evening, *Bismarck* momentarily turned upon her pursuers, and the *Prince of Wales* and *Suffolk* had a brief exchange of fire with her, but this action allowed *Prinz Eugen* to escape unnoticed into the Atlantic. Near midnight, *Bismarck* was hit by a torpedo from one of nine Swordfish aircraft flown off the carrier *Victorious.* The German battleship had to temporarily slow to 16 knots. A few hours later, however, contact with *Bismarck* was lost when the German ship shaped a new course for Brest, France.

Contact was not regained until the 26th. The carrier *Ark Royal* launched a torpedo strike at the *Bismarck,* but the aircraft attacked the friendly cruiser *Sheffield* by mistake, causing no damage. A second torpedo strike at 19.10, however, resulted in serious hits to *Bismarck.* Her rudder was jammed 12 degrees to port and a previous list made worse.

Because of her jammed rudder, *Bismarck* was now heading north towards British forces. A division of five British destroyers commanded by Captain P.L. Vian in *Cossack* was ordered to harass her until the battleship force led by Admiral Sir John Tovey in *King George V* could attack the next day. The destroyers launched 16 torpedoes during the night, with perhaps two or three hits resulting (disputed), while many near-misses from the *Bismarck's* guns troubled the destroyers in return.

By the time of the final battle on May 27, *Bismarck* was a wounded bull in a British arena – damaged, unmaneuverable, with an exhausted crew, and surrounded by two battleships (*King George V* and *Rodney*) and two cruisers (*Norfolk* and *Dorsetshire*). Though her gunfire often straddled her enemy targets, *Bismarck* failed to score a direct hit. Ship after ship fired on her with guns and torpedoes, until at 10.15

Bismarck's guns were silent and the action was called off. *Dorsetshire* then fired four torpedoes to finish her, and whether the two that hit or the *Bismarck*'s own scuttling charges did the job, she finally sank. Thus ended the first combat sortie of Hitler's first battleship. She died gallantly, taking with her all but 119 of her crew of over 2,000.

Battle of the Barents Sea, December 31, 1942

On December 22, 1942, convoy JW51B sailed from Scotland with fourteen merchant ships laden with war materiel and supplies for the Soviet Union. The convoy would have to navigate past the enemy-held coast of Norway to reach its destination in northern Russia. A local escort was provided as far as Iceland, after which the convoy was guarded by a fleet destroyer escort. Force R, the cruisers *Jamaica* and *Sheffield*, left the Russian port of Kola on the 27th to join the escort. Gales and atrocious weather from the 27th to the 29th scattered the convoy and escort ships. Only nine merchant ships remained with the destroyers *Onslow, Orwell, Obdurate* and *Obedient*. The *Jamaica* and *Sheffield* were due south of the convoy, but because of confused communications they believed the convoy was 150 miles east-northeast of its true position.

Meanwhile, in Altenfjord, Norway, German naval forces under the command of Vice Admiral Oskar Kummetz were being readied to implement Operation *Regenbogen*. The plan was to intercept and attack the convoy from both flanks. The heavy cruiser *Admiral Hipper* (Kummetz's flagship) with three destroyers would lure the British escort away from the convoy, while the pocket-battleship *Lutzow* (previously named *Deutschland*), also with three destroyers, would attack the convoy from the south.

Poor visibility, unreported observations, and incorrect position reports plagued both sides, but at 09.15 on the 31st, *Obdurate* challenged *Hipper*'s destroyers and was fired on. *Onslow* then spotted the *Hipper* and began firing. Running in and out of snow squalls, the *Hipper* returned fire. After a series of exchanges, the *Onslow* was seriously damaged and withdrew to rejoin the convoy. The action continued until the opposing forces turned away from each other, the British ships having seen the *Lutzow*, and the *Hipper* coming under fire from Force R (*Jamaica* and *Sheffield*). *Hipper* took several hits before escaping behind a smokescreen laid by her destroyers. The *Sheffield* then attacked the *Friedrich Eckholdt*, one of the destroyers accompanying *Hipper*. The *Eckholdt* was badly damaged and would later sink unseen in the icy waters of this cruelest of seas.

The *Lutzow*, despite having had many opportunities to fire on the convoy, did not do so until 11.42, and then fired only briefly. Forty-seven minutes later, the *Sheffield* engaged the *Lutzow* and came under fire from the *Hipper*. All ships then disengaged. The convoy arrived safely in Russia. The *Lutzow* had missed the chance to damage or destroy the convoy. Her captain reported poor visibility and bad light as the cause, but his instructions to avoid damage to his own ship contributed greatly to his overcautious approach.

Apart from the obvious results of the Barents Sea battle – ships sunk and damaged, men killed and wounded – there was a strategic effect for the German surface fleet. Hitler totally lost faith in it. In the remaining years of the war, the navy would find itself low down on the priority ladder when it came to sharing out the increasingly short supplies needed to maintain the war effort.

Pacific Battles: The Guadalcanal Campaign, 1942

In the finest tradition of the Imperial Navy we shall engage the enemy in night battle. Every man is expected to do his utmost. — Vice Admiral Gunichi Mikawa's message to his force before the Battle of Savo Island, August 8, 1942

[O]ur entire superiority was due almost entirely to our possession of radar. Certainly we have no edge on the Japs in experience, skill, training or performance of personnel. — Rear Admiral Willis Lee after the Second Battle of Guadalcanal

Bolstered by its stunning carrier victory at Midway in June 1942, the United States hastened to retake some of the Pacific islands that Japan had conquered in the first eight months of war. On August 7, the US 1st Marine Division invaded Guadalcanal Island in the Solomons chain, occupying an enemy air strip that was nearing completion and which threatened the Allied supply line from America to Australia. Thus began an arduous naval, air, and land campaign for a jungle island heretofore unknown to most Americans and Japanese that would last into early 1943 and result in heavy losses to both sides. By day, Allied aircraft could attack any Japanese ships that ventured too far down the Solomons channel (known as The Slot) toward Guadalcanal. At night, however, only Allied warships could interfere with Japan's attempts to bombard the Marines and reinforce the Japanese troops on the island. Consequently, many fierce night surface battles occurred for control of Guadalcanal, and US sailors soon gave its waters the grim nickname Iron Bottom Sound for all of the ships sunk there.

Battle of Savo Island, August 9, 1942

On the rain-lashed night of August 8-9, 1942, the first naval battle for control of the waters around Guadalcanal took place. Eleven US and Australian cruisers and destroyers patrolled the western approaches to the Lunga Roads anchorage where transports unloaded supplies and material for the Marines. The most-likely avenue of attack for a Japanese surface force was down the Slot from the west, and while the Allied ships were adequately stationed to cover that approach, their level of preparedness that evening would prove disastrously inadequate.

Two radar-equipped US destroyers, *Blue* and *Ralph Talbot*, formed the first line of defense and warning. However, the tall mass of nearby Savo Island, which divided the western approaches into northern and southern channels, interfered with their radar returns. Instead of sighting the enemy first with her high-tech gear, *Blue* was herself spotted by IJN lookouts – men who were chosen for their excellent night vision and equipped with nothing more than over-sized binoculars.

The attacking column of six Japanese cruisers (four heavy and two light) and a single destroyer was under the command of Vice Admiral Gunichi Mikawa. The IJN ships slid by the *Blue* undetected and proceeded through the southern entrance. The flagship in the van soon sighted the Allied force guarding this channel – two cruisers (one US and one Australian) and two US destroyers. Few on board the Allied ships knew what was happening when the Japanese cruisers launched spreads of deadly Long Lance torpedoes and opened fire with their guns. Massed rain clouds helped obscure the Japanese ships as they sped by, leaving death and destruction in their wake. The southern force was defeated and left in disarray in only seven minutes. Although the Allied ships managed to fire a few shots in return, the surprise and darkness hindered them and they scored no substantial hits. The Australian cruiser *Canberra* had to be scuttled next morning, and the US cruiser *Chicago* lost part of her bow to a torpedo hit. Her captain, who was in charge of the southern force that evening, later committed suicide while a USN inquiry into the battle was being conducted.

Even before Mikawa's ships engaged the southern force, they spotted the northern force of US ships, consisting of three cruisers and two destroyers. Rather than proceeding on to attack the transports at Lunga Roads, the Japanese ships turned northeast to deal with this second cruiser force. Again, they found the Allied ships unprepared and slow to react, but the Japanese organization also became unraveled as the light cruisers followed a different course than the one taken by Mikawa in the van ship, *Chokai*.

The US northern force failed to receive the few warnings sent it and made wrong assumptions about the flashes of gunfire to the south and the sounds of detonations that traveled through the water. Japanese searchlights snapped on, illuminating the US ships long enough for the gunners to achieve hits that then set fires on board the targets, illuminating them further. In 30 minutes, Japanese torpedoes and gunfire wreaked complete havoc on the northern force. The cruisers *Quincy* and *Vincennes* sank within an hour, while *Astoria* lingered on until noon.

After defeating the northern force, Mikawa chose to leave the area by the northern channel rather than change course for the transport anchorage. He needed time to regroup his scattered ships, and he feared US carrier air attacks at dawn. He was later censured for retiring from the battle too soon, but his victory, if not complete, was the result of his boldness, Japanese training, and Allied mismanagement (the flag officer and his ship, RAN *Australia*, was at Lunga Roads and missed the battle). The USN suffered its worst defeat since Pearl Harbor, losing 993 men killed and 645 wounded, while Australia lost 84 killed and 55 wounded. The Japanese suffered 58 killed and 71 wounded that night, but the USN submarine *S-44* torpedoed and sank the cruiser *Kako* next morning as it was returning from the mission.

Battle of Cape Esperance, October 11-12, 1942
The Japanese needed to retake Henderson Airfield on Guadalcanal if they were to prevent the Allies from expanding their control over the Solomon Islands and surrounding seas. To accomplish this, it was essential that the Japanese reinforce their troops already stationed on the island. Japanese ships made high-speed runs to Guadalcanal at night to unload supplies and troops and bombard the US Marine positions and airfield. Their habitual incursions became known as the Tokyo Express to their opponents.

On October 11, Rear Admiral Norman Scott put to sea to try and end the Tokyo Express runs of the Japanese. He had under his command a force consisting of two heavy cruisers, two light cruisers, and five destroyers. They were travelling in column with destroyers at front and rear.

The Japanese also had a cruiser and destroyer force present that night. Rear Admiral Arimoto Goto led three heavy cruisers and two destroyers. He was tasked with shelling Henderson Field while another force unloaded supplies for the Japanese troops. It was to be an unlucky night for the admiral, who was mortally wounded when American salvos smashed into the bridge of his ship, *Aoba*.

Although forewarned of the presence of the Japanese ships by radar, the Americans were caught in the middle of a turn maneuver when the Japanese suddenly appeared from out of a series of rainsqualls. Both the turn and the appearance of the enemy caused confusion in the American force. Individual captains were left to make the best of the situation. At 23.46 *Helena*'s captain gave the order to open fire and the battle commenced. The *Aoba* was hit as the American cruisers fired their broadsides. The destroyer *Fubuki* was hit first by *Boise* and *San Francisco*, then by every other American ship in the vicinity. She sank in flames.

One of the unfortunate outcomes of the battle of Cape Esperance was that in the confusion, and due to indiscipline within the American forces, there was a lot of damage incurred by friendly fire. Both the *Fahrenholt* and *Duncan* were damaged this way, *Duncan* so badly that she eventually had to be abandoned. Her crew was rescued by the destroyer *Gwin*, who suffered the least damage that night. Another American casualty was *Boise* who was hit by the cruiser *Furutaka*. Her damage was mild compared to that heaped on the unfortunate Japanese ship, which finally sank after taking numerous hits both above and below the waterline.

A demoralized Japanese force retreated back up the Slot, with *Kinugasa* in the lead followed by *Aoba*. This was the first time the Japanese had been defeated by the USN in a night battle, a result they had not expected. It would be harder in future to ensure the safety of the ships on the Tokyo Express supply runs. This night, however, while ships were burning and men were dying, the destroyers of the Tokyo Express had managed to land their troops and munitions.

Second Battle of Guadalcanal, November 14-15, 1942
Following the First Battle of Guadalcanal on November 13, 1942, in which a US cruiser force prevented the Japanese from bombarding Henderson Field, the Americans were alerted to another attempt by Japanese naval forces to reenter the waters around Guadalcanal. Planes from Henderson Field first sighted a Japanese squadron heading

down the Slot at 10.00 on the 14th, which was followed by a troop convoy. American bombers sent to attack these ships left only four transports and ten destroyers intact. The Japanese were ordered to regroup and continue on course despite their losses; Allied planes returned to base after sunset and would pose no further threat until dawn.

Vice Admiral Nobutake Kondo was ordered to bombard Henderson Field during the night so that the transports could land their troops at Tassafaronga on Guadalcanal. Kondo's force consisted of the battlecruiser *Kirishima*, two heavy cruisers, two light cruisers, and nine destroyers.

The American force in the area, under the command of Rear Admiral Willis Lee, had two modern battleships and four destroyers. Willis also had the latest radar and was expert in its use. At 23.00, amid ground clutter from Savo Island and Cape Esperance, the Japanese ships were detected on American radar. Starshells soon lit up the night and torpedoes traced their paths across the sea. The light cruiser *Nagara* sank the destroyer *Preston*. A second US destroyer, *Walke*, was hit by a Long Lance torpedo and sank slowly. *Benham*, a third destroyer, also was hit by a torpedo and forced to retreat. She sank next afternoon en route to the Allied base at Espiritu Santo, although the fourth destroyer, *Gwin*, rescued her surviving crew.

The heavyweight American battleships now joined the fight. Fire from the *Washington* disabled the IJN destroyer *Ayanami*, which later sank. The *South Dakota*, however, suffered a power failure, which put her guns out of action. Meanwhile, the Japanese destroyers, fearing these two powerful ships and unaware of *South Dakota*'s disability, sped out of the line of fire. The two light cruisers, *Nagara* and *Sendai*, remained on station. As the American battleships cleared Savo Island, they spotted the heavy cruisers *Atago* (Kondo's flagship) and *Takao*, with the battlecruiser *Kirishima* beyond. The *South Dakota* regained power but found herself targeted by the searchlights of the Japanese cruisers.

Kirishima began firing salvos at a range of five miles, and the IJN cruisers launched torpedoes and opened fire. Although the torpedoes missed, many shells struck *South Dakota*, setting fires in her superstructure. Lee's flagship, *Washington*, came to the aid of her ally and used radar to find her target. *Kirishima* was soon hit by nine 16" shells and approximately forty 5" shells. The battlecruiser was crippled, and Kondo's force retreated with *Kirishima* under escort. Lee moved to continue the action with the *Washington* alone, but soon gave up and retired because of the threat of torpedoes from the Japanese destroyers. Three hours later, *Kirishima* rolled over and sank. The troop transports beached themselves near Tassafaronga (their escorting destroyers ran back up the Slot), where American planes attacked them next morning.

Battle of Tassafaronga, November 30, 1942

The build up of Allied troops, ships, and equipment in the Guadalcanal area had put extreme pressures on the Japanese supply chain to the island. Japanese troops on Guadalcanal were literally on the edge of starvation as even IJN submarines and small transports found it difficult to carry supplies to them past the Allied air and sea blockade. A new method of delivering supplies was suggested. Oil drums would be cleaned and half-filled with rice. Several drums would be fastened together and 200 or more loaded onto each destroyer's deck. The destroyers would make a high-speed run to arrive off Guadalcanal during the night, where the drums would be pushed into the sea and hauled to shore by line.

The first run was scheduled for November 30, 1942. Eight destroyers were involved, commanded by Rear Admiral Raizo Tanaka. Four of these would drop drums off Tassafaronga, and two others would drop theirs off the mouth of the Umasani River. The Americans meanwhile sent Rear Admiral Carleton Wright's Task Force 67 to patrol the area. Wright's five cruisers and six destroyers arrived off Tassafaronga at 23.00 on the 30th to implement a surprise attack using radar to spot the enemy.

The US task force approached Tassafaronga from the east in a line of bearing formation to increase sightings. At 23.06 the flagship *Minneapolis*'s radar spotted the enemy, and the Americans switched to column formation on a northwest bearing. There was no moon, and clouds made the night very dark.

The Japanese column, steaming on a southeast course, prepared to drop the supply drums and slowed to 12 knots. At 23.16, however, Tanaka instructed his ships to cease preparation as it became clear enemy ships were approaching. He ordered all ships to attack.

The American force began to launch torpedoes at 23.20, followed by shellfire. There followed a series of rapid salvos during which the destroyer *Takanami*, closest to the Americans, took most of the punishment. The rest of the Japanese ships continued on course. They blended into the shadows of the coastline, and the Japanese made good use of the darkness to position their ships for optimum use of their Long Lance torpedoes. Within 10 minutes, six Japanese destroyers launched forty-four torpedoes total. The cruiser *Minneapolis* was struck by two torpedoes and made a virtual cripple. *New Orleans* became a drifting ball of fire as she too was hit. *Pensacola* was hit after she passed the damaged ships, and she also erupted in a mass of flames. The last cruiser to be hit was the *Northampton*. Flames and smoke reached skyward as oil and fuel ignited. Aware of the close proximity of American destroyers, the Japanese abandoned *Takanami*, which finally sank. Of the four severely damaged US ships, only the *Northampton* failed to reach harbor. She sank at 03.04.

The Battle of Tassafaronga was a bitter pill for the Americans who had expected to defeat the enemy destroyer force with their more powerful cruiser guns. None of the Japanese supply drums reached Guadalcanal, but the Americans paid a high price in men, ships, and morale.

However, Japanese enthusiasm for Guadalcanal waned due to Japan's own high losses in the campaign. The Allies gained final control of the island in February 1943 when the remaining Japanese troops were taken off Guadalcanal. The losses to both sides in the campaign had proved much higher than anyone had anticipated.

■ DESIGNERS' NOTES

Our goal with FIGHTING STEEL was to provide players with an opportunity to face the challenges and make the kinds of decisions made by division commanders during WWII surface engagements. Having spent much of our lives spread out on the floor fighting with miniature warships, we thought it was time to use the computer to provide the fun and visual spectacle that we enjoyed playing miniatures. From the beginning, we were intrigued with the computer's ability to simulate night battles, something that miniatures and naval boardgames have always had difficulty in doing. Another design goal was to incorporate the confusion between friendly forces that occurred during night actions. During the development process, a process that took over 18 months, there were many issues to deal with.

Sim vs. Wargame
While making FIGHTING STEEL, we found ourselves constantly coming back to that we always intended FS to be a wargame and not a simulation. In fact, the phrase we used to best describe FS around the office was that it is "a real-time wargame in 3D."

What is the difference between a sim and a wargame? As we saw it a sim usually tries to put people in charge of one thing – one plane, one tank, one submarine – and sims usually worry about modeling true physics as much as possible. Since sims deal with tactical situations (small numbers of planes, tanks, and ships) they can be gamed in real-time and in 3D. With FS we were also dealing with a tactical situation and battles that could be gamed in real-time, but we didn't want to get bogged down in the detail of any one ship. As a division commander, the player should not be worrying about actually aiming and firing the guns on his ships. Nor did we want to get saddled with having to rely on physics models to recreate the action. In many ways, it is much more difficult to get a physics model to simulate actual results because all it takes is missing one of the factors to throw the model off. With FS we use formulas for all of the important gunnery, damage, and visibility effects. These formulas, although obviously simplified, lead to fairly accurate results, and in many cases they are much more accurate than previous games that have tried to sim the situation.

Divisions and How They Maneuver
When we first started work on FS, we wanted to model the maneuvering capabilities of the different navies in surface battles. We had thoughts of allowing many different formations, while restricting certain navies from performing various maneuver actions during a battle. After studying the problem for several months, along with discussions with our two technical advisors, it became clear that what one can do on the "parade ground" is much different from what one can do in the face of the enemy. Although navies did form scouting lines, and were able to move from line of bearing to line abreast, it was not something they did once in battle. Basically, ships either moved in a column or they turned simultaneously, thus going into a line of bearing. It was these two formations that we kept (along with the box convoy formation). It was also almost unheard of during a battle to create a new division or have ships return to a division once detached. Basically, as a battle wore on, the formations got smaller, and did not regroup themselves until hours after the battle had concluded.

In the game, there is a definite advantage to the player with only a few divisions versus a player forced to control many divisions (unless you pause the game against a computer opponent). The player with many divisions will have a harder time ordering all of the divisions while the clock continues to tick. This was an unintentional but desired outcome, as in real life it is more difficult to control multiple divisions of ships. Another factor we wanted to simulate was the difficulty of maneuvering a division of multiple ships. Locking a player into a turn once ordered was done because this is how navies acted in combat. Sending signals to perform a division turn was time consuming, and if rushed or done at the wrong time could lead to ships falling out of line, or worse, colliding with friendly ships. We do give players the benefit of the doubt in allowing them to begin a turn just as quickly as it can be entered into the computer. It could take up to a minute to start a turn, but we are assuming that some of the legwork is being done in advance of the actual order to turn. In many ways the best advice we can give players is to make 100% certain that the maneuver you are about to execute is the one you want to do, because there's no going back.

Where Are the Planes and Subs?
During development we were continually asked by reviewers and beta testers why we had not included subs and planes in FIGHTING STEEL. The simple answer is that we were making a game that dealt with surface combat engagements, battles that showcased the battleships and cruisers in the kinds of battles they were built to fight. Very few surface battles between opposing warships also involved aircraft and/or submarines; in fact, only Leyte Gulf in 1944 comes to mind. The biggest impact aircraft had on those fighting surface battles was the threat that air power could catch and sink any crippled ships that could not get out of an enemy-controlled area after a surface battle. This happened repeatedly at Guadalcanal in 1942 and in a way happened to the Bismarck in 1941. We made sure that we included this effect in FS by having Air/Sea Control as a scenario variable.

Why Only 1939-42?
Most of the surface actions that occurred during WWII took place prior to the end of 1942. By 1943 the dominance of air power limited the likelihood of large-scale surface battles. Most ships went through refits to fit additional AA guns onto the ships for protection. Also, by 1943 radar began to be used to its full capabilities, making it even harder for navies deficient in the use of radar, like the IJN, to compete against those with radar. In the end we decided that the amount to be gained by covering the last few years of WWII would not be worth the additional effort required to deal with the items mentioned above. The time for even surface battles was over by the beginning of 1943.

Where's the Land?

This was a very difficult issue for us. It's hard to deny that land could be a factor in naval battles. This was simply a matter of us deciding that it was better to do nothing than to do something poorly. To program land into FS, we would have needed to spend a lot of time working with the artificial intelligence to ensure it didn't run aground or spend its time weaving around just to avoid land. After looking at the time it would take to properly deal with land vs. the fact that land actually very rarely directly affected the actions of ships during a battle, we decided we had better leave land for the next game in the series. If given unlimited time and resources, we would have built land into FS; however, when doing a wargame for what is perceived to be a small niche market, resources can be hard to come by. In the end, there were just too many other things we felt more important than bringing land into the game. Also in the end, not having land as a reference point was useful in helping our random battles in Division Commander mode be as confused as night naval battles were in real life.

Division Commander Mode

Having two game modes, Division Commander and Standard, came from our basic understanding that there are two types of wargamers in the world. The first wants to control everything, know everything that any of their units knows, and doesn't really want to worry about having their own units shoot at each other. For these players, we provided the Standard mode that, along with the ability to pause the game and give orders while playing against the computer, gives these players the ability to play FS as if it was a turn-based boardgame. The second type of wargamer wants the ultimate in realism (without actually seeing blood). They want to be surprised by the enemy and don't mind a little confusion among their own ships in order to obtain this realism. Using Division Commander mode is the only way to truly capture the confused state of affairs that existed during a night battle. I think the most enjoyable way to play FS is to play with four players in a Division Commander mode random night battle. You just never know what to expect.

Command Control

Even with Division Commander mode, we couldn't simulate all of the confusion that exists during a naval battle (and didn't really want to). Although we do model the time it takes for information to pass from a lookout or a radar operator to the captain of a ship, we still pass the information from the captain to the division commander instantaneously. In reality, as at the Battle of Cape Esperance, much critical time could be lost before key information was given to the division commander. At Cape Esperance, the Japanese were spotted on radar for over ten minutes before the contact was reported to the Flag Admiral. The Admiral's decision to station himself on a ship that had older radar equipment cost him critical information.

Also, the Mistaken Maneuver realism option came about from a quick study of Cape Esperance. However, even there we have helped the player by making it impossible for the flagship to make a wrong turn. Sounds like a safe assumption, doesn't it? However, at Cape Esperance the Flag Admiral issued orders for a column turn. Upon executing the order he was surprised to find his flagship, which was in the middle of the column, executing an immediate simultaneous turn! In this way the flagship threw the entire column into confusion and directly led to the sinking of a US destroyer by friendly fire. Confusion can be a great gaming element, but too much confusion can take the fun out of a game. Only you the players can tell us if we got this right.

Weather and Visibility

For FS we decided to keep things simple, and this is why we only have one visibility level that exists in the entire battle area and for the length of the battle (unless you hit sunrise or sunset). We knew that for most people this would be enough, and it would make things easier to understand and display. In reality visibility is much more complicated as rainsqualls can obscure one part of the battle area, and can come and go quicker than the ships themselves. Again, given unlimited time and resources, we would have tried to tackle this issue as a Preference item for players, but instead we opted to leave it for a future game.

Main Gun and Secondary Gun Targeting

We have tried to provide a system for targeting that allows players a lot of flexibility but which requires little input to obtain the desired results. We separated targeting for main guns and secondary guns because they most often had different roles. Main guns were intended to engage targets of a similar class or larger, while secondary guns were almost always used at close range to fire at destroyers that were threatening a torpedo attack. Through the proper use of division targeting modes, players can quickly gang up on the closest target or biggest threat, or spread their fire out among enemy ships. In small day battles, players have time to use the single ship gunnery orders to split fire between several targets (two for main guns and two for secondary guns). We felt that the capability to defend against up to four ships simultaneously was more than enough, as generally it is advisable to concentrate your fire.

A Word of Thanks

We would like to acknowledge the terrific assistance we received from Wayne Hughes and Tom Halwachs, two professors at the Naval Post-Graduate School in Monterey, California. Thanks to a chance purchase of Wayne's book FLEET TACTICS (a must read for anyone interested in naval warfare) and the power of the Internet to locate someone, we were able to link up with Wayne and Tom early in the development process. They were kind enough to give us many hours of their time to discuss the issues that most affected those fighting surface naval battles. For this help we will be eternally grateful.

See You on the Internet

So now that FIGHTING STEEL is finally complete, we hope to see you somewhere on the Internet and look forward to fighting multiplayer battles with many of you. We sincerely hope you find the game as much fun as we do.

Joel Billings   *Roy Gibson*
Producer - SSI   Owner/Designer/Programmer - Divide By Zero

■ **REFERENCE**

Glossary

Aft: toward the back, or in the back part of a ship.

AP: armor-piercing ammunition designed to break through armored plates before exploding (and therefore less effective against unarmored targets).

Armor Belt: a series of hardened-steel plates along the side of the ship to protect it from shots striking the side.

Armor Deck: a thick deck of hardened steel to protect the ship from bombs and plunging fire striking from above.

Battery: a group of guns of the same size, usually firing together.

Beam: (1) the width of a ship; (2) to the side of the ship.

Bearing: the compass direction from one ship to another.

Bow: the front end of a ship.

Bridge: a platform or open compartment above the deck level of a ship from which the vessel is commanded.

Broadside: the use of all main guns on a ship, only possible when firing to one side or the other.

Caliber: (1) the diameter of the bore of a gun measured in inches; (2) the ratio of barrel length to diameter.

Class: a set of ships built in quick succession sharing the same basic design.

Conning Tower: an armored pilothouse on a surface vessel.

Course: the direction in which a ship is intended to move.

Director: the station from which a single officer or staff directs the fire of all or a set of the ship's guns.

Displacement: the weight of water a ship displaces, used as a measure of the ship's total size (although the weight can vary according to the amount of equipment and supplies loaded on the hull).

Draught: the depth of the deepest part of a ship underwater.

Fire Control: a system for controlling the ship's gunfire.

Forward: toward the bow, or in the front part of a ship.

HE: high-explosive ammunition designed to create a maximum blast effect (and therefore most effective against unarmored targets).

Heading: the direction that a ship's bow is pointing.

Knot: a measure of speed in the water based on nautical miles per hour.

Machinery: a ship's engines.

Magazine: a room where ammunition is stored.

Main Armament: the primary battery of guns on a ship, generally designed for engaging other ships of the same general size.

Nautical Mile: a maritime measure of distance equal to 6,080 feet.

Port: (1) a developed harbor; (2) nautical term for the left-hand side of a ship.

Quarter: the after part of a ship's side.

Rangefinder: a device, optical or electronic, designed to determine the distance from one ship to another as an aid to gunnery.

Salvo: a simultaneous discharge of shots from a battery of guns.

Secondary Armament: batteries of guns on a ship of a smaller caliber than the main armament, generally designed for engaging smaller craft.

Spread: the distance between projectiles, whether shells or torpedoes (the wider the spread, the greater the likelihood one of the projectiles will hit, but the less chance that several will hit together).

Starboard: nautical term for the right-hand side of a ship.

Stern: the back end of a ship.

Straddle: a salvo whose waterspouts fall on both sides of the target as seen from the firing ship, indicating that the guns have found the correct range and deflection.

Trajectory: the arc that a shell follows as it moves through the air.

Turret: an armored gunhouse that swivels.

Wing Turret: a turret placed to one side of the ship's centerline, with a matching wing turret on the other side to maintain the ship's balance.

Bibliography

Boyne, Walter J. *Clash of Titans: World War II at Sea* (1995).

Breyer, Siegfried. *Battleships and Battle Cruisers, 1905-1970* (1970).

Conway's All the World's Fighting Ships, 1906-1921 (na).

Conway's All the World's Fighting Ships, 1922-1946 (na).

Cook, Charles. *The Battle of Cape Esperance* (1968).

Costello, John. *The Pacific War* (1981).

Edwards, Bernard. *Salvo!: Classic Naval Gun Actions* (1995).

Frank, Richard B. *Guadalcanal: The Definitive Account of the Landmark Battle* (1990).

Garzke Jr., William H. & Robert O. Dulin Jr. *Battleships: United States Battleships, 1935-1992* (1976).

Gray, Edward. *Hitler's Battleships* (1992).

Grove, Eric. *Sea Battles in Close-Up: World War II*, Vol.2 (1993).

Hughes, Wayne P. *Fleet Tactics: Theory and Practice* (1986).

Isby, David C. "CA: Tactical Naval Warfare in the Pacific, 1941-43," *Strategy & Tactics Magazine* (May 1973).

Lacroix, Eric & Linton Wells II. *Japanese Cruisers of the Pacific War* (1997).

Mallmann Showell, Jak P. *The German Navy in World War Two: A Reference Guide to the Kriegsmarine, 1935-1945* (na).

Morison, Samuel Eliot. *The Struggle for Guadalcanal* (1948).

Morison, Samuel Eliot. *The Two-Ocean War: A Short History of the United States Navy in the Second World War* (1963).

Preston, Antony. *Battleships, 1856-1977* (1977).

Preston, Antony. *Navies of World War II: An Illustrated History* (1998).

Raven, Alan & Roberts, John. *British Battleships of World War Two: The Development and Technical History of the Royal Navy's Battleships and Battlecruisers from 1911 to 1946* (1976).

Raven, Alan & Roberts, John. *British Cruisers of World War Two* (1980).

Silverstone, Paul H. *U.S. Warships of World War 2* (1965).

Stephen, Martin (Eric Grove, ed.). *Sea Battles in Close-Up: World War II* (1988).

Van der Vat, Dan. *The Pacific Campaign: The U.S.-Japanese Naval War, 1941-1945* (1991).

Whitley, M.J. *Battleships of World War Two: An International Encyclopedia* (1998).

Whitley, M.J. *Cruisers of World War Two: An International Encyclopedia* (1998).

Whitley, M.J. *Destroyers of World War Two: An International Encyclopedia* (1988).

Whitley, M.J. *German Destroyers of World War Two*, 2nd edition (1991).

Boardgames

Avalon Hill. *Bismarck* (1979).

C in C. *North Cape* (1978).

Clash of Arms Games. *Command at Sea: The Rising Sun* (1994).

Quarterdeck Games. *Ironbottom Sound: The Guadalcanal Campaign* (1983).

Simulations Publications, Inc. *CA* (1973).

Victory Games. *Tokyo Express* (1988).

Ship Class Data Table
Royal Navy

TYPE	CLASS	VP VALUE	HIT PTS	MAX SPEED	MAIN GUNS	SECONDARY GUNS	TERTIARY GUNS	TORPEDOES	CCF	BELT	DECK	MAIN TURRET	SEC TURRET	SUSP/CT	CT	TORP DEF
BB	King George V	421	42076	29.00	10 x 14" C45	16 x 5.25 C50	None	None	256	15.00	6.00	16.00	1.00	2.00	16.00	3
BB	Nelson	413	41250	23.00	9 x 16" C45	12 x 6" C50	6 x 4.7" C40	None	160	14.00	6.00	16.00	1.50	2.00	14.00	2
BB	Queen Elizabeth	365	36450	24.00	8 x 15" C42	20 x 4.5" C45	None	None	128	13.00	3.50	13.00	1.00	2.00	10.00	1
BB	Royal Sovereign	332	33240	21.00	8 x 15" C42	14 x 6" C45	8 x 4" C45	None	64	13.00	3.50	13.00	6.00	2.00	11.00	1
BC	Hood	407	45200	29.00	8 x 15" C42	8 x 4" C45	None	None	76	12.00	3.00	15.00	1.00	2.00	12.00	1
BC	Renown	334	37150	30.25	6 x 15" C42	20 x 4.5" C45	None	None	96	9.00	3.00	11.00	1.00	2.00	10.00	1
CL	Caledon	50	5029	27.00	5 x 6" C45	None	None	8 x 21" MK IX	64	3.00	1.00	1.00	0.00	1.00	6.00	0
CL	Carlisle	53	5250	28.00	8 x 4" C45	None	None	None	64	3.00	1.00	1.00	0.00	1.00	3.00	0
CL	D Class	60	6030	27.00	6 x 6" C45	None	None	12 x 21" MK IX	64	3.00	1.00	1.00	0.00	1.00	1.00	0
CL	Emerald	96	9562	33.00	7 x 6" C45	None	None	12 x 21" MK IX	64	3.00	1.00	1.00	0.00	1.00	1.00	0
CA	Hawkins	95	9450	29.00	6 x 7.5" C45	None	None	None	64	3.00	1.00	1.00	0.00	1.00	3.00	0
CA	Exeter	110	11000	32.00	6 x 8" C50	4 x 4" C45	None	6 x 21" MK IX	40	4.00	2.00	2.00	0.00	1.00	1.00	0
CA	Kent	145	14500	32.00	8 x 8" C50	4 x 4" C45	None	8 x 21" MK IX	48	5.00	4.00	2.00	1.00	1.00	2.50	0
CA	Arethusa	74	7400	32.00	6 x 6" C50	4 x 4" C45	None	6 x 21" MK IX	16	2.75	1.00	1.00	0.50	1.00	1.00	0
CL	Dido	69	6850	32.00	10 x 5.25" C50	None	None	6 x 21" MK IX	32	3.00	1.00	4.50	0.00	0.50	1.00	0
CL	Edinburgh	132	13175	32.00	12 x 6" C50	12 x 4" C45	None	6 x 21" MK IX	96	4.50	2.00	4.00	0.00	2.00	2.00	0
CL	Fiji	105	10450	31.50	12 x 6" C50	8 x 4" C45	None	6 x 21" MK IX	32	3.50	2.00	2.00	0.50	0.50	4.00	0
CL	Leander	97	9740	32.00	8 x 6" C50	4 x 4" C45	None	8 x 21" MK IX	32	4.00	1.00	1.00	0.50	1.00	1.00	0
CL	Perth	92	9150	31.00	8 x 6" C50	4 x 4" C45	None	8 x 21" MK IX	32	3.00	1.50	1.00	0.50	1.00	1.00	0
CL	Southampton	122	12190	30.00	12 x 6" C50	8 x 4" C45	None	6 x 21" MK IX	64	4.25	2.00	1.00	0.50	1.00	1.00	0
DD	AB Class	22	1815	35.00	4 x 4.7" C45	None	None	8 x 21" MK IX	8	1.00	0.50	0.50	0.00	0.50	0.50	0
DD	CD Class	23	1942	36.00	4 x 4.7" C45	None	None	8 x 21" MK IX	24	1.00	0.50	0.50	0.00	0.50	0.50	0
DD	EF Class	25	2049	36.00	4 x 4.7" C45	None	None	8 x 21" MK IX	1	1.00	0.50	0.50	0.00	0.50	0.50	0
DD	GHI Class	23	1690	36.00	4 x 4.7" C45	None	None	8 x 21" MK IX	16	1.00	0.50	0.50	0.00	0.50	0.50	0
DD	JKN Class	28	2330	36.00	6 x 4.7" C45	None	None	10 x 21" MK IX	16	1.00	0.50	0.50	0.00	0.50	0.50	0
DD	LM Class	33	2725	36.00	6 x 4.7" C45	None	None	8 x 21" MK IX	16	1.00	0.50	0.50	0.00	0.50	0.50	0
DD	OP Class	27	2270	37.00	4 x 4" C45	None	None	8 x 21" MK IX	16	1.00	0.50	0.50	0.00	0.50	0.50	0
DD	QR Class	30	2480	36.00	4 x 4.7" C45	None	None	8 x 21" MK IX	16	1.00	0.50	0.50	0.00	0.50	0.50	0
DD	Tribal Class	30	2519	36.50	8 x 4.7" C45	None	None	4 x 21" MK IX	64	1.00	0.50	0.50	0.00	0.50	0.50	0
TR	Fast Transport	100	15000	15.00	None	None	None	None	0	0.00	0.00	0.00	0.00	0.00	0.00	0
TR	Transport	100	10000	8.00	None	None	None	None	0	0.00	0.00	0.00	0.00	0.00	0.00	0

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United States Navy

TYPE	CLASS	VP VALUE	HIT PTS	MAX SPEED	MAIN GUNS	SECONDARY GUNS	TERTIARY GUNS	TORPEDOES	CCF	BELT	DECK	MAIN TURRET	SEC TURRET	SUPSTCT	CT	TORP DEF
BB	California	403	40345	21.00	12 x 14" C50	16 x 5" C38	None	None	160	14.00	5.00	18.00	6.00	2.00	5.00	1
BB	Maryland	336	33590	21.00	8 x 16" C45	8 x 5" C38	None	None	160	14.50	5.00	18.00	6.00	2.00	5.00	1
BB	Nevada	317	31706	21.00	10 x 14" C45	8 x 5" C51	8 x 5" C25	None	0	13.50	5.00	18.00	13.00	2.00	16.00	1
BB	New Mexico	362	36157	22.00	12 x 14" C50	12 x 5" C51	8 x 5" C25	None	0	13.50	5.00	18.00	14.00	2.00	16.00	1
BB	North Carolina	444	44377	28.00	9 x 16" C45	20 x 5" C38	None	None	44	12.00	5.50	16.00	6.00	2.00	15.00	2
BB	Pennsylvania	359	35929	21.00	12 x 14" C45	12 x 5" C51	8 x 5" C25	None	0	13.50	5.00	18.00	13.00	2.00	16.00	1
BB	South Dakota	445	44519	27.50	9 x 16" C45	20 x 5" C38	None	None	44	14.00	5.75	18.00	6.00	2.00	16.00	2
BB	Texas	319	31924	21.00	10 x 14" C45	16 x 5" C51	None	None	128	12.00	3.50	14.00	6.00	2.00	12.00	1
CA	NewOrleans	112	12463	33.00	9 x 8" C55	8 x 5" C25	None	None	8	5.00	2.25	6.00	1.00	1.00	2.00	0
CA	Northampton	103	11420	32.50	9 x 8" C55	8 x 5" C25	None	None	0	3.75	2.00	2.50	1.50	1.00	1.00	0
CA	Pensacola	104	11512	32.50	10 x 8" C55	4 x 5" C25	None	None	0	4.00	2.00	2.00	1.00	0.50	1.00	0
CA	Portland	115	12755	32.50	9 x 8" C55	8 x 5" C25	None	None	0	4.00	2.00	3.00	1.00	1.00	2.00	0
CL	Atlanta	83	8340	32.50	16 x 5" C38	None	None	8 x 21" MK 15	32	3.75	1.25	1.25	0.00	1.00	1.25	0
CL	Brooklyn	110	12207	32.50	15 x 6" C47	8 x 5" C25	None	None	8	5.00	2.00	5.00	0.50	2.00	5.00	0
CL	Omaha	95	9508	34.00	10 x 6" C53	None	None	6 x 21" MK 15	8	3.00	1.50	0.50	0.00	1.00	1.00	0
DD	Bagley	27	2245	38.50	4 x 5" C38	None	None	16 x 21" MK 15	16	0.50	0.50	0.50	0.00	0.50	0.50	0
DD	Benham	27	2250	38.50	4 x 5" C38	None	None	16 x 21" MK 15	4	0.50	0.50	0.50	0.00	0.50	0.50	0
DD	Benson	29	2395	36.00	5 x 5" C38	None	None	10 x 21" MK 15	6	0.50	0.50	0.50	0.00	0.50	0.50	0
DD	Farragut	25	2064	36.50	5 x 5" C38	None	None	8 x 21" MK 15	4	0.50	0.50	0.50	0.00	0.50	0.50	0
DD	Fletcher	35	2924	38.00	5 x 5" C38	None	None	10 x 21" MK 15	18	0.75	0.50	0.50	0.00	0.50	0.00	0
DD	Mahan	25	2103	36.50	5 x 5" C38	None	None	12 x 21" MK 15	4	0.50	0.50	0.50	0.00	0.50	0.50	0
DD	Porter	31	2597	37.00	8 x 5" C38	None	None	8 x 21" MK 15	4	0.50	0.50	0.50	0.00	0.50	0.50	0
DD	Sims	28	2313	35.00	4 x 5" C38	None	None	8 x 21" MK 15	18	0.50	0.50	0.50	0.00	0.50	0.50	0
DD	Somers	33	2767	37.00	8 x 5" C38	None	None	12 x 21" MK 15	4	0.50	0.50	0.50	0.00	0.50	0.50	0
DD	Flush Deck DD	13	1107	35.00	4 x 4" C50	None	None	12 x 21" MK 15	4	0.50	0.50	0.50	0.00	0.50	0.50	0
DD	APD	13	1107	35.00	1 x 3" C50	None	None	12 x 21" MK 15	4	0.00	0.00	0.00	0.00	0.50	0.00	0
TR	Fast Transport	100	15000	15.00	None	None	None	None	0	0.00	0.00	0.00	0.00	0.00	0.00	0
TR	Transport	100	10000	8.00	None	None	None	None	0	0.00	0.00	0.00	0.00	0.00	0.00	0

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Imperial Japanese Navy

TYPE	CLASS	VP VALUE	HIT PTS	MAX SPEED	MAIN GUNS	SECONDARY GUNS	TERTIARY GUNS	TORPEDOES	CCF	BELT	DECK	MAIN TURRET	SEC TURRET	SUPSTCT	CT	TORP DEF
BB	Fuso	347	39536	23.00	12 x 14" C45	14 x 6" C50	8 x 5" C40	None	32	12.00	4.00	12.00	6.00	2.00	13.75	1
BB	Ise	356	39535	23.00	12 x 14" C45	16 x 5.5" C50	8 x 5" C40	None	40	12.00	5.00	12.00	6.00	2.00	12.00	1
BB	Nagato	385	42753	25.00	8 x 16" C45	18 x 5.5" C50	8 x 5" C40	None	40	11.80	3.50	14.00	6.00	2.00	14.00	1
BB	Yamato	700	69990	27.00	9 x 18.1" C45	12 x 6.1" C60	12 x 5" C40	None	52	16.00	9.00	25.00	6.00	10.00	20.00	3
BC	Kongo	324	36000	30.00	8 x 14" C45	14 x 6" C50	8 x 5" C40	None	24	8.00	4.50	9.00	6.00	2.00	10.00	0
CA	Aoba	133	10651	33.00	6 x 8" C50	4 x 4.7" C45	None	8 x 24" LL	20	3.00	1.50	1.00	0.50	1.00	1.00	0
CA	Furutaka	118	9433	33.00	6 x 8" C50	4 x 4.7" C45	None	8 x 24" LL	20	3.00	1.50	1.00	0.50	1.00	1.00	0
CA	Mogami	171	13668	35.00	10 x 8" C50	8 x 5" C40	None	12 x 24" LL	6	4.00	2.50	1.00	0.50	1.00	1.00	0
CA	Nachi	164	13120	34.00	10 x 8" C50	8 x 5" C40	None	16 x 24" LL	6	4.00	1.50	3.00	0.50	0.50	1.00	0
CA	Takao	183	14604	34.00	10 x 8" C50	8 x 5" C40	None	16 x 24" LL	20	4.00	1.50	1.00	0.50	1.00	1.00	0
CA	Tone	190	15200	35.00	8 x 8" C50	8 x 5" C40	None	12 x 24" LL	24	4.00	1.25	1.00	0.50	1.00	1.00	0
CL	Nagara	66	5902	36.00	7 x 5.5" C50	2 x 3" C40	None	8 x 24" LL	12	2.50	1.25	0.50	0.50	0.50	0.50	0
CL	Sendai	80	7100	35.00	7 x 5.5" C50	2 x 3" C40	None	8 x 24" LL	14	2.50	1.00	0.50	0.50	1.00	1.00	0
CL	Tenryu	39	4350	33.00	4 x 5.5" C50	2 x 3" C40	None	6 x 21" 8th Year	14	2.00	1.00	0.50	0.50	1.00	1.00	0
CL	Yubari	50	4400	35.50	6 x 5.5" C50	None	None	4 x 24" LL	14	2.00	1.00	1.00	0.00	1.00	1.00	0
DD	Akatsuki	29	1950	38.00	6 x 5" C50	None	None	9 x 24" LL	2	0.50	0.50	1.00	0.00	0.50	0.50	0
DD	Akizuki	56	3700	33.00	8 x 3.9" C65	None	None	4 x 24" LL	8	0.50	0.50	1.00	0.00	0.50	0.50	0
DD	Asashio	35	2330	35.00	6 x 5" C50	None	None	8 x 24" LL	20	0.50	0.50	1.00	0.00	0.50	0.50	0
DD	Fubuki	36	2389	34.00	6 x 5" C50	None	None	9 x 24" LL	8	0.50	0.50	1.00	0.00	0.50	0.50	0
DD	Hatsuharu	27	1802	36.00	5 x 5" C50	None	None	6 x 24" LL	2	0.50	0.50	1.00	0.00	0.50	0.50	0
DD	Kagero	37	2450	35.00	6 x 5" C50	None	None	8 x 24" LL	8	0.50	0.50	1.00	0.00	0.50	0.50	0
DD	Kamikaze	21	1720	34.00	4 x 4.7" C45	None	None	6 x 21" 8th Year	2	0.50	0.50	1.00	0.00	0.50	0.50	0
DD	Minekaze	20	1650	35.00	4 x 4.7" C45	None	None	6 x 21" 8th Year	2	0.50	0.50	1.00	0.00	0.50	0.50	0
DD	Mutsuki	22	1445	37.00	4 x 4.7" C45	None	None	8 x 24" LL	2	0.50	0.50	1.00	0.00	0.50	0.50	0
DD	Shiratsuyu	29	1950	34.00	5 x 5" C50	None	None	8 x 24" LL	2	0.50	0.50	1.00	0.00	0.50	0.50	0
DD	Yugumo	37	2480	35.00	6 x 5" C50	None	None	8 x 24" LL	8	0.50	0.50	1.00	0.00	0.50	0.50	0
TR	Fast Transport	100	15000	15.00	None	None	None	None	0	0.00	0.00	0.00	0.00	0.00	0.00	0
TR	Transport	100	10000	8.00	None	None	None	None	0	0.00	0.00	0.00	0.00	0.00	0.00	0

Kriegsmarine

TYPE	CLASS	VP VALUE	MAX SPEED	HIT PTS	NIGHT FIGHTING	MAIN GUNS	SECONDARY GUNS	WEAPONS TERTIARY GUNS	TORPEDOES	CCF	ARMOR PROTECTION BELT	DECK	MAIN TURRET	SEC TURRET	SUPSTCT	CT	TORP DEF
BB	Bismarck	509	29.00	50900	Good	8 x 15" C47	12 x 5.9" C52	16 x 4.1" C65	None	88	12.50	4.50	14.25	4.00	2.00	14.00	3
BC	Scharnhorst	350	32.00	38900	Good	9 x 11" C28	12 x 5.9" C52	14 x 4.1" C65	None	80	13.75	4.00	14.00	4.00	2.00	14.00	2
CA	Deutschland	160	28.00	16000	Good	6 x 11" C28	8 x 5.9" C52	6 x 4.1" C65	None	44	4.00	1.50	5.50	0.50	1.00	6.00	0
CA	Hipper I	182	32.50	18200	Good	8 x 8" C60	12 x 4.1 C65	None	8 x 21" G7A T1	64	4.00	1.25	6.25	0.50	1.00	6.00	0
CL	KClass	81	32.00	8130	Good	9 x 5.9" C52	None	None	12 x 21" G7A T1	80	2.75	1.50	1.25	0.00	1.00	4.00	0
CL	Leipzig	83	32.00	8250	Good	9 x 5.9" C52	None	None	12 x 21" G7A T1	80	2.75	1.50	1.25	0.00	1.00	4.00	0
CL	Nurnberg	90	32.00	8971	Average	9 x 5.9" C52	None	None	12 x 21" G7A T1	80	2.75	1.50	1.25	0.00	1.00	4.00	0
DD	1934A Type	38	38.20	3165	Average	5 x 5" C45	None	None	8 x 21" G7A T1	24	1.00	1.00	1.00	0.00	1.00	4.00	0
DD	1936 Mob Type	43	38.50	3597	Average	5 x 5.9" C46	None	None	8 x 21" G7A T1	28	1.00	1.00	1.00	0.00	1.00	1.00	0
DD	1936 Type	41	40.00	3415	Average	5 x 5" C45	None	None	8 x 21" G7A T1	30	1.00	1.00	1.00	0.00	1.00	1.00	0
DD	1936A Type	43	38.50	3605	Average	4 x 5.9" C46	None	None	8 x 21" G7A T1	26	1.00	1.00	1.00	0.00	1.00	1.00	0
TR	Fast Transport	100	15.00	15000	Average	None	None	None	None	0	0.00	0.00	0.00	0.00	0.00	0.00	0
TR	Transport	100	8.00	10000	Average	None	None	None	None	0	0.00	0.00	0.00	0.00	0.00	0.00	0

Crew Data Table*

MONTH-YEAR	ROYAL NAVY QUALITY	FATIGUE	NIGHT FIGHTING	KRIEGSMARINE QUALITY	FATIGUE	NIGHT FIGHTING	UNITED STATES NAVY QUALITY	FATIGUE	NIGHT FIGHTING	IMPERIAL JAPANESE NAVY QUALITY	FATIGUE	NIGHT FIGHTING
Sep-39	Average	Fresh	Good	Average	Fresh	Average	Average	Fresh	Poor	Average	Fresh	Average
Oct-39	Average	Fresh	Good	Average	Fresh	Average	Average	Fresh	Poor	Average	Fresh	Average
Nov-39	Average	Fresh	Good	Average	Fresh	Average	Average	Fresh	Poor	Average	Fresh	Average
Dec-39	Average	Fresh	Good	Average	Fresh	Average	Average	Fresh	Poor	Average	Fresh	Average
Jan-40	Average	Normal	Average	Average	Fresh	Average	Average	Fresh	Poor	Average	Fresh	Good
Feb-40	Average	Normal	Average	Average	Fresh	Average	Average	Fresh	Poor	Average	Fresh	Good
Mar-40	Average	Normal	Good	Average	Normal	Average	Average	Fresh	Poor	Average	Fresh	Good
Apr-40	Average	Normal	Average	Average	Normal	Average	Average	Fresh	Poor	Average	Fresh	Good
May-40	Average	Normal	Average	Average	Normal	Average	Average	Fresh	Poor	Average	Fresh	Good
Jun-40	Average	Normal	Average	Average	Normal	Average	Average	Fresh	Poor	Average	Fresh	Good
Jul-40	Average	Tired	Average	Average	Normal	Average	Average	Fresh	Poor	Average	Fresh	Good
Aug-40	Average	Tired	Average	Average	Normal	Average	Average	Fresh	Poor	Average	Fresh	Good

Crew Data Table

MONTH-YEAR	ROYAL NAVY QUALITY	FATIGUE	NIGHT FIGHTING	KRIEGSMARINE QUALITY	FATIGUE	NIGHT FIGHTING	UNITED STATES NAVY QUALITY	FATIGUE	NIGHT FIGHTING	IMPERIAL JAPANESE NAVY QUALITY	FATIGUE	NIGHT FIGHTING
Sep-40	Average	Tired	Average	Average	Normal	Average	Average	Fresh	Poor	Average	Fresh	Good
Oct-40	Average	Tired	Average	Average	Normal	Average	Average	Fresh	Poor	Average	Fresh	Good
Nov-40	Average	Tired	Average	Average	Normal	Average	Average	Fresh	Poor	Average	Fresh	Good
Dec-40	Average	Tired	Average	Average	Normal	Average	Average	Fresh	Poor	Average	Fresh	Expert
Jan-41	Average	Normal	Average	Average	Normal	Average	Average	Fresh	Poor	Average	Fresh	Expert
Feb-41	Average	Normal	Average	Average	Normal	Average	Average	Fresh	Poor	Average	Fresh	Expert
Mar-41	Average	Normal	Good	Average	Normal	Average	Average	Fresh	Poor	Average	Fresh	Expert
Apr-41	Average	Normal	Good	Average	Normal	Average	Average	Fresh	Poor	Average	Fresh	Expert
May-41	Veteran	Normal	Good	Average	Normal	Average	Average	Fresh	Poor	Average	Fresh	Expert
Jun-41	Veteran	Normal	Good	Average	Normal	Average	Average	Fresh	Poor	Average	Fresh	Expert
Jul-41	Veteran	Normal	Good	Average	Normal	Average	Average	Fresh	Poor	Average	Fresh	Expert
Aug-41	Veteran	Normal	Good	Average	Normal	Average	Average	Fresh	Poor	Average	Fresh	Expert
Sep-41	Veteran	Normal	Good	Average	Normal	Average	Average	Fresh	Poor	Average	Fresh	Expert
Oct-41	Veteran	Normal	Good	Average	Normal	Average	Average	Fresh	Poor	Average	Fresh	Expert
Nov-41	Veteran	Normal	Good	Average	Normal	Average	Average	Fresh	Poor	Average	Fresh	Expert
Dec-41	Veteran	Normal	Good	Average	Normal	Average	Average	Normal	Poor	Average	Fresh	Expert
Jan-42	Veteran	Tired	Good	Average	Normal	Average	Average	Normal	Poor	Average	Normal	Expert
Feb-42	Veteran	Tired	Good	Average	Normal	Average	Average	Normal	Poor	Veteran	Normal	Expert
Mar-42	Veteran	Tired	Good	Average	Normal	Average	Average	Normal	Poor	Veteran	Normal	Expert
Apr-42	Veteran	Tired	Good	Average	Normal	Average	Average	Normal	Poor	Veteran	Normal	Expert
May-42	Veteran	Tired	Good	Average	Normal	Average	Average	Normal	Poor	Veteran	Normal	Expert
Jun-42	Veteran	Tired	Good	Average	Normal	Average	Average	Normal	Poor	Veteran	Normal	Expert
Jul-42	Veteran	Tired	Good	Average	Normal	Average	Average	Normal	Poor	Veteran	Normal	Expert
Aug-42	Veteran	Tired	Good	Average	Normal	Average	Average	Normal	Poor	Veteran	Normal	Expert
Sep-42	Veteran	Tired	Good	Average	Normal	Average	Average	Normal	Average	Veteran	Normal	Expert
Oct-42	Veteran	Tired	Good	Average	Normal	Average	Average	Normal	Average	Veteran	Tired	Expert
Nov-42	Veteran	Tired	Good	Average	Normal	Average	Veteran	Normal	Average	Veteran	Tired	Expert
Dec-42	Veteran	Tired	Good	Average	Normal	Average	Veteran	Normal	Average	Veteran	Tired	Expert

*Value shown is base level value for each navy. Each ship's level is determined separately using the base level as the "average" or most likely level.

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Gun Data Table

Royal Navy

GUN TYPE	MAXIMUM RANGE YARDS	DAMAGE FACTOR HIT POINTS	PENETRATION VALUE INCHES	RELOAD TIME SECONDS
16" C45	39780	2048	29	35
15" C42	33550	1938	27	30
14" C45	38560	1590	26	30
8" C50	30650	256	11	11
7.5" C45	21110	200	8	20
6" C50	25800	100	8	12
6" C45	20620	100	8	15
5.25" C50	24070	80	7	8
4.7" C45	16970	50	5	5
4.7" C40	16160	50	5	6
4.5" C45	20750	55	5	5
4" C45	19850	35	4	5

Kriegsmarine

GUN TYPE	MAXIMUM RANGE YARDS	DAMAGE FACTOR HIT POINTS	PENETRATION VALUE INCHES	RELOAD TIME SECONDS
15" C47	38800	1764	29	26
11" C28	39890	662	23	20
8" C60	36680	289	11	12
5.9" C52	25150	100	8	8
5.9" C46	25700	88	8	8
5" C45	19030	62	6	8
4.1" C65	19360	33	4	5

United States Navy

GUN TYPE	MAXIMUM RANGE YARDS	DAMAGE FACTOR HIT POINTS	PENETRATION VALUE INCHES	RELOAD TIME SECONDS
16" C45	36900	2700	29	30
14" C50	36300	1500	28	45
14" C45	34300	1500	28	50
8" C55	31860	260	11	18
6" C53	26700	105	8	8
6" C47	26000	130	8	8
5" C51	15850	50	6	7
5" C38	18200	55	6	3

United States Navy, cont.

GUN TYPE	MAXIMUM RANGE YARDS	DAMAGE FACTOR HIT POINTS	PENETRATION VALUE INCHES	RELOAD TIME SECONDS
5" C25	14500	54	6	4
4" C50	15920	33	4	6
3" C50	14590	13	3	3

Imperial Japanese Navy

GUN TYPE	MAXIMUM RANGE YARDS	DAMAGE FACTOR HIT POINTS	PENETRATION VALUE INCHES	RELOAD TIME SECONDS
18.1" C45	45960	3219	34	31
16" C45	42000	2249	32	28
14" C45	38770	1485	28	35
8" C50	32150	278	11	20
6.1" C60	29960	123	8	12
6" C50	22970	100	8	15
5.5" C50	21600	84	6	12
5" C50	20100	51	6	10
5" C40	16075	51	6	8
4.7" C45	17500	45	5	6
3.9" C65	21300	29	4	4
3" C40	11800	13	3	2.5

Torpedo Data Table

NAME	SPEED IN KNOTS*	RANGE IN YARDS	DAMAGE FACTOR HIT POINTS
Royal Navy			
21" Mk IX	41/35	11000/15000	3381
Kriegsmarine			
21" G7A T1	44/40/30	6560/8750/15300	2185
United States Navy			
21" Mk 15	45/33/27	6000/10000/15000	3403
Imperial Japanese Navy			
24" Long Lance	45/35/22	21900/35000/43700	5832
21" 6th year	36/32/26	7650/10900/16400	2185

*Torpedoes have multiple speed settings with the faster the speed the shorter the range.

■ FIGHTING STEEL CREDITS

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DIVIDE BY ZERO, INC.

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■ **CONTACTING TECHNICAL SUPPORT**

Ubi Technical Support

Technical support: 0870 800 6160 (local rate call)
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Please be as specific as you can be about the problem you are experiencing. Also include in the body of your e-mail: the name of the manufacturer of your computer system; the brand and speed of the processor; how much RAM you have, the version number of Windows you are using (if you aren't sure, right-click on the My Computer icon on your desktop and select 'Properties'), and the manufacturer name and model-number of your video card, modem, and sound card.

Other Support Options

You can also contact Ubi Soft Customer Support by phone and fax. When you call, please have all of the above mentioned information ready.

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http://www.ubisoft.dk If you have a question, which is not described on our website, please e-mail us at: support@ubisoft.dk
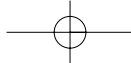Other ways of reaching us: By telephone or fax, please call:

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SSI Online

If the game about which you are inquiring has been out for more than 90 days, you'll also want to visit out website to be sure you are running the latest version of the game before contacting SSI Technical Support. The SSI website is located at www.ssionline.com. From time to time, addition al scenarios and maps may also be post to this website.

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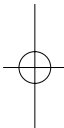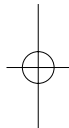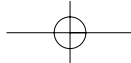In order to play FIGHTING STEEL, the game CD must be in the CD-ROM drive.